BUILDING CLARITY:

STRUCTURAL LEGIBILITY, CORPORATE TRANSPARENCY, AND PUBLIC ACCESSIBILITY IN BUFFALO'S INDUSTRIAL ARCHITECTURE, 1880-1920

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Focusing on three building types in particular, the grain elevator, the daylight factory and the powerhouse, this dissertation traces the multiple ways in which architecture was used to clarify the presence of industry in America from 1880-1920. The notion of 'architectural clarity,' or transparency, emerges throughout this work in a diversity of physical, phenomenological and cultural definitions. Examining the ways in which industrial architecture conveyed specific messages to the public, this dissertation considers this notion of clarity as it emerged in three major ways: structural legibility, corporate transparency and public accessibility. Architects worked with engineers and corporations in order to advertise, educate and entertain the general public about the role of industry during this time, through a variety of design solutions, business tactics, and factory tours. This work traces the evolution of these types of professional and public encounters with grain elevators, daylight factories and powerhouses from the early twentieth century to the early twenty-first.

As each of these three building types originated or significantly advanced in Buffalo and Niagara Falls in some way, a regional approach to this architectural history is integral to

this study. By viewing these building types through a variety of visual media, professional journals, and promotional materials, this work addresses the role of architecture in shaping, influencing and controlling public perceptions of industry as it was evolving in the Buffalo-Niagara region at an alarming rate from 1895-1901. Utilizing a methodology that integrates the perspectives, experience and histories of the engineers, general contractors and laborers alongside architects wherever possible, this work views the design, construction and operation of industrial architecture as an inherently collaborative process. Addressing the local, national and international conceptions of Buffalo's industrial architecture through these images and ephemera can demonstrate both the emphases and exclusions that occur when discussing industry in the architectural canon at large. In doing so, this dissertation aims to not only conceptualize, but also mobilize, this history of industrial architecture in order to integrate this complicated past into a continually evolving urban landscape in the present.

BIOGRAPHICAL SKETCH

Annie Sloan Schentag is obtaining her Ph.D. in the History of Architecture and Urban Development at Cornell University, and also works professionally in Historic Preservation in Buffalo, NY. She received a B.A. in Art History at Smith College, an M.U.P. in Urban and Regional Planning at the State University of New York at Buffalo, and an M.A. in the History of Architecture and Urban Development prior to completing her doctoral dissertation at Cornell University.

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INTRODUCTION

The history of the Buffalo-Niagara region is closely intertwined with the history of American industrial architecture, and it is nearly impossible to separate these two subjects. As an inherently industrial place, the Buffalo-Niagara region provides an ideal location to focus this study of industrial architecture. Much like the topic of industrial architecture, the city of Buffalo is understudied, and the canonical marginalization of these two subjects is likely related to some degree. In this sense, the subject matter of this dissertation pushes against the canon in two major ways: by focusing on Buffalo, and by focusing on industrial architecture.

During the nineteenth and early twentieth centuries, Buffalo was a place characterized by innovation. The city was established and expanded in large part due to its essential geographic position as a crossroads for trade, which attracted many types of industrial enterprises in the nineteenth and twentieth centuries. As entrepreneurs and engineers developed new methods and building types to capitalize on the city's ideal geographic location at the junction of the Great Lakes and the Niagara River, the city continued to grow in the mid-to-late nineteenth century. The invention of the grain elevator in 1842 is the most well-known example of the city's industrial architectural history, but it is also essential to acknowledge that Buffalo was characterized by a diversity of other industries at the time. The pronounced presence of industries such as steel manufacturing, shipbuilding, and hydroelectric power-generation also led to substantial architectural innovations in terms of building materials and construction methods. With far reaching impacts on regional, national and global production methods, the city presents an ideal location to examine the intersection between American architecture and industry during this time.

While Buffalo experienced multiple waves of intense industrial developments and innovations from the early nineteenth century into the late twentieth century, this dissertation focuses primarily on the years surrounding the turn of the century. Each chapter features a different building type within roughly the same time period, examining the developments that occurred primarily in the years 1895-1901. These six years were incredibly transformative for Buffalo's industrial sector, when new building materials, technologies, construction methods and production systems emerged in multiple industries nearly simultaneously. Situating these developments within a broader context, however, the dissertation also traces the inspiration and impact of these innovations in the years surrounding 1895-1901. Examining both the origins and resulting influences of these architectural developments as well as the more precise moment of their emergence, the dissertation also incorporates a broader temporal scope that spans from roughly the 1880s to the 1920s.

In addition to broadening the temporal boundaries of this study, this dissertation also expands the geographical scope of the study to include the regional context of these developments. While Buffalo forms the focus of much of the discussion, the architectural innovations that occurred there can best be understood in relation to Niagara Falls. Sharing far more than geographical resources along the waterways of the Niagara River, Lake Erie and Lake Ontario, Buffalo and Niagara Falls cultivated unique, but interconnected, urban identities within a broader regional context. Examining the Buffalo-Niagara region, rather than solely Buffalo itself, acknowledges the closely intertwined economy, manufacturing industries, transportation networks, technological developments and tourism industry that linked these two areas together. The years surrounding 1895-1901 were particularly instrumental in creating connectivity throughout this region, as the expansion of transportation networks, the development and transmission of hydroelectricity between cities, and the Pan-American Exposition all re-branded the area as an interconnected region during this time. This moment of heightened connectivity between Buffalo and Niagara Falls was inspired in part by the industrial developments that occurred around the turn of the twentieth century, thus making a regional approach to this architectural history integral to this study. While Chapter One focuses on Buffalo and Chapter Two mainly on Niagara Falls, Chapter Three more directly examines this regional relationship in terms of the tourist industry that Buffalo and Niagara Falls shared at the turn of the twentieth century.

Often sidelined in scholarship, industrial architecture is relegated to the outskirts of the canon, much like Buffalo itself. Associated primarily with engineering rather than architecture, grain elevators, factories and powerhouses appear more often in trade journals than in architectural publications. This has had the inadvertent effect of relegating these building types to technical discussions rather than cultural and artistic ones. This oversimplified polarity between scientific engineering and artistic architecture is deeply rooted in the historiographic tradition, which often segregates industrial topics to different chapters or even different books entirely. Industrial architecture is too often a causality of this rigid binary system, which misses an important opportunity to analyze the prominent aesthetic qualities of these structures. Grain elevators, daylight factories and powerhouses are typically understood today in terms of their important technological innovations, which undoubtedly fueled and improved the nation's industrial sector in essential ways. Historians and engineers such as William Brown and Milo Ketchum have endured under a labor of love to provide detailed analyses of the highly technical operations of these structures, promoting the sophistication of their designs in ways that do these structures justice.[1] These contributions are essential, but examining them from aesthetic and cultural angles is also needed.

Industrial architecture functioned as far more than a series of technological improvements, serving as a combination of educational and promotional tactics manifested in steel, concrete and glass. At the onset of the industrial era, factory architecture employed not only logistical solutions to new production lines, but also design elements that promoted company values and assuaged cultural concerns. While relatively little has been written about the factory as a representative of corporate identity, historian Roland Marchand's *Creating the Corporate Soul* (1998) approached industrial architecture as a specimen of advertising history.[2] He demonstrated the ways in which the factory has become a symbol of corporate stability, hygiene and efficiency, often personifying the company itself. Examining the ways factories have been visually reproduced and interpreted to serve advertising needs is central to this discussion, in tandem with the architectural design of these buildings themselves. Industrial structures, I argue, were built at least in part as corporate advertisements- displaying the clean, well-lit, efficient and benevolent environments that corporations hoped to project to consumers as their own values. Once they were built as advertisements, featuring their images in advertisements was the natural next step. In Niagara Falls, for instance, the Shredded Wheat factory provides a stunning example of industrial advertising, one which synonymizes the "Palace of Light" factory building with the 'other' wonder of the world, Niagara Falls. The company interpreted their industrial role as one of purity and progress through these visual representations on its postcards, tour pamphlets, magazine advertisements and even cereal boxes.

Just as images can shape an understanding of industry, industry can in turn shape an image of a city. The Buffalo region's image is industrial, both literally and figuratively. In an article devoted to some of Buffalo's historic representations, historian Peter B. Hales stated, "pictures play a central role in the construction of urbanity's myths, in their promulgation, adaptation and rejuvenation. They also provide the anchors for a continuum in the transformations of the city, as both construction and idea in America."[3] Not only do images of grain elevators appear on the city's coffee mugs and t shirts, but their association with blue collar, working class values continues to identify the city as a place with industrial roots, operating as an 'anchor for continuum' even in today's increasingly digital economy. The connections put forth in these visual advertisements serve to not only unite factory architecture with industrial corporations, but industries with cities themselves. The branding of Buffalo as an industrial city makes it a place ripe for studying the relationship between architectural images and industrial history. How do visual representations circulate, distort and perpetuate the public perception of a city over time? The local, national and international conceptions of Buffalo have changed alongside the shifting role of industry, and comparing these insider and outsider perspectives will be central to this analysis.

Focusing on three building types in particular, the grain elevator, the daylight factory and the powerhouse, this dissertation traces the evolution of public encounters with industrial architecture from the early twentieth century to the early twenty-first. This work is organized into three chapters, with each chapter devoted to a particular building type and material. References to other types, however, offer comparative instances that more loosely define ‘industrial’ architecture as it was perceived by both professional and public viewers. By including inherently non-industrial examples in each chapter as well, this work addresses the broader relationship that commercial, administrative and recreational buildings can have with industrial architecture. Geographically, the dissertation travels from Buffalo to Niagara Falls from the south to the north. Beginning at the origin of major industrial commerce in the city, Chapter One focuses on the grain elevator district just south of downtown. Focusing on an intermediate stage of grain elevator developments at the end of the nineteenth century, the era of steel construction, this chapter is the first scholarly contribution to directly compare the grain elevator to the early steel skyscrapers that emerged in American cities at roughly the same time. Chapter Two follows the grain industry northwards to Niagara Falls, where a daylight factory known as the Palace of Light produced shredded wheat at the turn of the century. In similar ways to the Larkin Administration Building, the architectural design of this factory reflected corporate attempts to provide the illusion of transparency and gain consumer trust. The third chapter turns to another type of industry and industrial typology, the hydroelectric powerhouses that were the source of the Buffalo-Niagara region’s industrial growth in multiple sectors. Together, the Adams Powerhouse in Niagara Falls and the Electricity Buildings and displays at the Pan American Exposition form the focus of this chapter. Each of these buildings, both permanent and impermanent, incorporated infrastructure into their architectural designs in order to accommodate tourists. By taking a closer look at this tourist infrastructure, this work demonstrates the ways in which building professionals, potential consumers, and the curious public each encountered industrial architecture through a carefully crafted combination of design tactics that aimed to attract, instruct, and entertain their viewers.

More so than many other types of architecture, the public historically engaged with industrial architecture only at limited and highly controlled moments. Unlike the casual encounters that the average citizen could have by simply walking into a commercial or institutional building, the public encounter with industrial architecture required guidance, education and interpretation in order to ensure that citizens would have a safe and highly regulated experience. Industrial architecture, and the industries it served, was therefore far more mysterious, confusing and illegible than other types of architecture- and perhaps it still is today. Acknowledging this, this dissertation subsequently examines the ways in which some types of industrial architecture were specifically designed to advertise, educate and entertain the public about the industrial productions at hand. Rather than solely providing a formal analysis of their design, this dissertation focuses on the public perception of these industrial structures as it was shaped by various media. In this sense, how was industrial architecture defined, perceived and understood by building professionals, in comparison with the general public? The presence of physical infrastructure, specific building materials and aesthetic elements in industrial buildings all provide insight into the ways that architecture played a central role in translating 'industry' to the national public, to local industrial workers, and to other designers worldwide.

The theme of architectural clarity appears throughout this dissertation in many forms. A multifaceted definition of this term is central to this work, as each chapter utilizes this word to elucidate industrial architecture from a slightly different perspective.

While preexisting scholarship has used words like transparency to discuss the physical characteristics of architecture in terms of building materials and the relationship of walls to openings, this dissertation acknowledges those other definitions while also developing new ones. Architects Colin Rowe and Robert Slutzky examined the concept of transparency in the 1960s, identifying a literal and rational definition as well as a phenomenal and even experiential one. Viewing both the physical and conceptual associations the word 'transparency' can indicate, Rowe and Slutzky observed that its definition "ceases to be that which is perfectly clear and becomes instead that which is clearly ambiguous."[4] As they stated, "the adjective *transparent*, by defining a purely physical significance, by functioning as a critical honorific, and in being dignified with far from disagreeable moral overtones, becomes a word which...is richly loaded with the possibilities of both meaning and misunderstanding."[5] In order to avoid the potential 'misunderstandings' that Rowe and Slutzky associate with the term 'transparency,' this dissertation also uses 'clarity' to accommodate a more expansive definition of the architectural search for a structurally expressive, legible and readily understandable building that provides clues to both designers and the general public about its form, function and more elusive cultural roles.

This work uses the term 'clarity' as an umbrella term that includes these definitions of transparency but also accommodates other aspects of this concept. These words are not always interchangeable, but they do overlap in meaning. Aside from the physical form of clarity, wherein architectural form is made literally transparent through materials like glass, other forms of clarity can occur on cultural, corporate and touristic levels. Efforts to make industrial architecture legible, or at least appear legible, to both the general public and building professionals is at the root of this study of clarity. Aside from the physical type of transparency that can be perceived as in the case of glass, clarity plays a significant, if often overlooked, conceptual role in architectural design. Particularly for industrial building types that were difficult for the public to decipher at a distance, clarity was both an architectural and cultural goal. This type of conceptual clarity appears in this dissertation in many forms, ranging from structural legibility (Chapter One) to corporate honesty (Chapter Two) to public accessibility (Chapter Three). Embracing these interrelated definitions of clarity that both includes and transcends physical transparency, this dissertation applies this term in multiple ways that are united in the search for a type of industrial architecture that is physically, programmatically, and culturally expressive to the outside viewer.

Chapter One considers the structural legibility of grain elevators in relation to their seemingly clear relationship between form and function. At the most basic level, grain elevators are inherently opaque, typically constructed of concrete with little to no windows. Yet this material opacity should not prevent these buildings from being considered transparent in other ways, particularly given their association with 'pure' geometric forms. Moving beyond these more literal definitions of transparency and architectural clarity, Chapter Two considers the daylight factory as a physical expression of the quest to present industrial corporations as honest, trustworthy and clean. While glass played a substantial role in these designs, the literal transparency of this glass was conveyed in other ways as well. Utilizing architecture to convey specific messages to the consuming public, businesses advertized their own corporate transparency through both physical and cultural indicators. Taking a closer look at the interaction between industrial architecture and the public, Chapter Three examines architectural clarity in terms of tourist accessibility. As tourists made their ways into industrial buildings and exhibits in the early twentieth century, they encountered architectural features that were specifically designed to accommodate them. Addressing the tourist infrastructure designed to elucidate certain concepts and experiences, this chapter defines clarity in terms of the architectural strategies employed to make the notion of 'industry' more accessible to the public. Examining both the physical architecture and its mediation through a variety of images, this work begins to unravel the ways in which industrial architecture was built with clarity in mind, designed to appear both physically and culturally accessible in order to convey specific, carefully crafted ideas about the role of industry on a local, national and international scale at the turn of the twentieth century.

Beyond Local

Histories written about the Buffalo-Niagara region tend to divide themselves into two categories: those written by locals and those by outside scholars. Books written by locals such as Mark Goldman, Francis Kowsky, and Timothy Bowen, provide excellent overviews of the city's urban history, often organized chronologically by neighborhood and featuring prominent citizens.[6] Published by mostly non-academic presses, these books seem aimed at a primarily regional audience, connecting the public with their history in essential ways. Jack Quinan's numerous books on Frank Lloyd Wright focus on his works in Buffalo, and as a locally based scholar he has done much to draw outside architectural attention to the city.[7] For Niagara Falls, William Irwin and Ginger Strand have done much to draw attention to the region's history of tourism and natural wonders.[8]

More recently, Miram Paeslack's edited volume *Ineffably Urban* demonstrates the potential for serious scholarship on the city, bringing in a combination of local and outside scholars for contributions by Peter Hales, Andreas Huyssen and Hadas Steiner.[9] Publications that include outside scholars, however, still tend to garner more attention in the academic realm than local publications, lending legitimacy to the city as worthy of broader interest. My work begins to challenge that- why must a history written by local scholars be doomed to provincialism? Perhaps the answer lies in intended audience. While I intend to contribute to the local understanding of the city's history, I do so with a national and even international relevance in mind.

Despite the marginalization of this subject matter, Buffalo has also, almost unwittingly, been featured prominently in the broader architectural canon for the past century. As several scholars have observed, photographs of the city's grain elevators have appeared in renowned works by Walter Gropius, Erich Mendelsohn and Le Corbusier, who each had an intense, if somewhat oversimplified, fascination for their skeletal form and innovative engineering. Eleven photographs of grain elevators reproduced in Gropius' *Jahrbuch des Deutschen Werkbundes* (1913), three of which were of Buffalo (although improperly labeled), quickly became the new illustrations for the modern age, ushering in the prominence of American architectural innovation for the first time. Reproductions and editions of these photographs appeared in subsequent publications by not only other modernist architects, but also by architectural historians. Mid-to-late-twentieth-century textbooks by Vincent Scully and Walter Behrendt adapted the tradition of using these structures to illustrate the emergence of modern American architectural innovation, often using the same photographs that appeared in Gropius' and

Corbusier's works.[10] Generations of students and scholars reading texts by Sigfried Gideon, Bruno Taut and Manfredo Tafuri have encountered Buffalo's architecture in these images, even if only in passing as a transition between the Industrial Revolution and the Great Depression.[11] Architectural historian Reyner Banham acknowledged the canonical role of Buffalo's commercial and residential architecture but the marginalization or absence of industrial architecture from these textbooks, stating, "They need to be brought back among the 'canons of giant architecture'...as much as the work of a Richardson or a Wright, for they represent the triumph of what is American in American building art."[12] This dissertation operates from the same standpoint, simultaneously addressing the ways in which these industrial buildings have been incorporated into the canon as well as the ways in which they have been excluded. Chapter One takes a closer look at the multiple ways in which images of industrial architecture were used, or ignored, in relation to the canon.

Placing Buffalo's industrial architecture amongst this internationally significant realm tends to blur notions of the local and the global, a theme that continually emerges in this dissertation. Conflating these two realms, this dissertation examines the international circulation of these local industrial places through their images and tourist practices. Examining the ways that both of these mediums impact the perception of Buffalo's industrial architecture for both outsiders and locals, this dissertation draws on geographer Doreen Massey's argument that the local uniqueness of a place is "a product of wider contacts; the local is always already a product, in part, of 'global' forces or the world beyond the place itself."[13] Outside scholarship, rather than locally produced publications, seems to more easily legitimize Buffalo as a place worthy of serious study in the global realm.

Certainly, the attempt to write about Buffalo with a simultaneously local, national, and international perspective requires some effort in order to transcend provincialism. German scholar Andreas Huyssen has acknowledged the prevalent attitude of resistance towards scholarship on the region, stating:

> A city like Buffalo, together with other Rust Belt cities, has become peripheral to that which is conjured up when we speak emphatically of the American city. Of course, there is no single model of the American city- not New York, not Los Angeles, not Chicago...But what is the centered city anyway in an age of transnational networks and globalizing connections?...All cities today are world cities, part center and part periphery.[14]

In this sense, it is essential that historians expand the boundaries of their gaze. Diversifying the geographic locations that are most commonly accepted for study will also diversify interpretations, leading historians to encounter different issues. It is no less legitimate an endeavor to apply rigorous scholarship to Buffalo than it is to New York or Los Angeles, yet far more books that focus on the latter are awarded prizes by the Society of Architectural Historians each year. In an increasingly globalized world, there is no place that is only relevant to locals anymore- and it is time for our classrooms and our contributions to reflect that.

Reyner Banham's *A Concrete Atlantis* is a profoundly important example of taking a step in this direction. The 1986 publication put Buffalo on the map in a global sense, even if only for a rare moment in the sun. Demonstrating the relevance of Buffalo's industrial structures- both grain elevators and daylight factories, as this dissertation also examines- Banham raised the city's often overlooked architectural contributions to the global realm. Illustrating the influence of Buffalo's industrial architecture on European modernist architects through the European circulation of photographs, Banham asserted, "It could be argued, and with very little exaggeration, that Elevators A, B and C of the Washburn-Crosby complex constitute the most internationally influential structures ever put up in North America because of their effect on the architectural vocabulary of the generation of the founders of modern architecture."[15] With his characteristic boldness, Banham elevated Buffalo's often overlooked industrial structures to new heights, placing them on a nationally and globally relevant pedestal for essentially the first time in major academic scholarship.

Banham's work claimed a new space for the city's industrial structures in the architectural canon. Prior to *A Concrete Atlantis,* many textbooks only mentioned Buffalo, if at all, for of its buildings designed by Frank Lloyd Wright, H.H. Richardson and Louis Sullivan. Banham's work provided a newly compelling reason to include Buffalo in an international discussion of not just residential or commercial architecture, but also industrial architecture. The conversation about Buffalo's industrial history became, for arguably the first major time since the early 1900's, one of national and international relevance, rather than just a local or regional discussion. In this sense, Banham's contributions in *A Concrete Atlantis* were influential for the future of architectural historiography worldwide, but profoundly so for Buffalo in particular.

Banham also explicitly recognized his own "European eyes" that positioned him as an outsider, although one who also resided in Buffalo as a semi-local.[16] It seems logical that this position, as both an outsider and someone with deep local knowledge, would have at least partly motivated his inspiration to grapple with the relationship between Europeans and Americans in writing *A Concrete Atlantis*. Somewhat similarly, my own position as a Buffalo native has inspired my own approach to this material. Just as Banham used his European eyes to examine other European eyes, I use my local ones to contribute a local dimension to this international discussion. Where Banham focused his analysis on outsiders, I turn mine on insiders, juxtaposing local and global perspectives in order to explore the ways in which these categories are made, perceived, and perhaps even dissolved.

In some ways, this dissertation humbly nods to *A Concrete Atlantis*, picking up where Banham left off in some cases. Loosely mirroring his organizational structure, this work views different aspects of some of the same buildings and building types as Banham did. Rather than viewing them primarily in a comparative context with European modernism however, this work approaches these same building types in terms of their relationship to the development of the American architectural and engineering professions, and to the American public. By viewing these building types through a variety of media, professional journals, and promotional tactics, this work addresses the role of architecture in shaping, influencing and controlling public perceptions of industry as it was evolving during the late nineteenth and early twentieth centuries, and at an alarming rate in Buffalo from 1895-1901.

In doing so, this work addresses forms of architecture that are not always spelled with a capital A. As industrial architecture is often relegated primarily to the field of engineering in journals, scholarship and even classrooms, any examination of these building types must necessarily expand the boundaries of what is canonically favored as architecture. Beyond this more practical requirement, however, lies the impetus to complicate these definitions. While high quality scholarship devoted to vernacular architecture has continued to emerge in the past ten years, publications on these types of subjects are still relatively rare. Historian Kingston Heath's *The Patina of Place* offers a fantastic counter-example, demonstrating the ability to produce a book-length study of worker housing in New Bedford that succeeds in being as broadly relevant as it is carefully specific.[17] Historian John Vlach offers another approach in *Back of the Big House*, where he passes over the traditionally studied mansions of southern plantations in favor of a closer examination of the slave houses instead.[18] These examples are certainly not exclusive, as other scholars have also found new ways to illuminate the dusty corners of architectural history by expanding the scope of subject matter to incorporate underrepresented types of architecture. Applying this methodology to the subject of Buffalo's industrial structures, this work similarly considers the field of 'architecture' from a more holistic, inclusive vantage point.

Moving from the grain elevators to the commercialized adaptation of that grain into prepackaged breakfast cereal at the Palace of Light, this dissertation was inspired partly by Banham's constant willingnesss to expand the typical definitions of what could be considered architecture. His conviction, as architectural historian Barbara Penner admired, "that even mundane stuff merited critical attention" challenged the academy to "situate architecture not only within the profession's narrowly prescribed aesthetic boundaries but more broadly within a pop cultural landscape."[19] Like Banham, I do not "see mass culture as inauthentic in comparison with working-class culture," and as such have approached this dissertation with the intent of viewing industrial architecture from multiple perspectives.[20] Shedding light on construction companies, general contractors, materials manufacturers, and laborers, this work attempts to incorporate a diversity of underrepresented perspectives and experiences in comparison with those of architects and engineers. Addressing these key figures within the context of broader cultural concerns, this work also examines industrial architecture in tandem with the industries they represent. For instance, it is not enough to examine grain elevators purely for their form, but rather for the role they played in the grain industry, the impact that industry had on broader urban developments and local residents, and the ways in which they fundamentally transformed our conceptions of food production and consumption.

Professional journals provide essential insight into the role that industrial architecture played in articulating the divide between architecture and engineering. Examining the ways in which grain elevators, factories and powerhouses appeared in different types of journals, this work considers the diverse perspectives of architects and engineers embedded in their presentation of these building types. As the professional divisions between these two fields became increasingly pronounced in the late nineteenth and early twentieth century, the delineation between art and technology, and between commercial and industrial architecture, became more pronounced.[21] Professional journals provide historical insight into the ways in which industrial architecture became integral to demarcating this dividing line between architecture and engineering. This work both highlights and complicates the binary division between architects and engineers through a close study of the ways in which these buildings were designed, constructed and perceived.

Moving beyond these two professions, this dissertation also sheds light on other parties that experienced industrial buildings on a daily basis. By examining other roles that were involved in the construction of these buildings, it is possible to envision a broader scope of the design process than is typically presented. In viewing the influential role that general contractors, construction crews and materials manufacturers had behind the scenes, a far more collaborative process is evident than at first glance, challenging the 'individual genius' of the architect that is typically asserted in historical scholarship. This work begins to give engineers, contractors and laborers their due, as these professions often served as a key link between structurally similar projects such as the steel skyscraper and the grain elevator. Unsung heroes emerge from the shadows of their more-often celebrated counterparts. Chapter One, for instance, illuminates the fundamental impact that Dankmar Adler had on Louis Sullivan's design for the Guaranty Building, one of the nation's first steel-framed skyscrapers located in downtown Buffalo. Trained as an engineer with experience in architectural design, Adler occupied an important and often overlooked position at the crux of these two fields at a time when they were becoming increasingly separate. Examples like this one illustrate the ways in which this dissertation aims to break open the traditionally confined categories of architecture and engineering, of aesthetic design and construction technology, and of form and function. Utilizing a methodology that integrates the perspectives, experience and histories of the engineers, builders and laborers wherever possible, this work views the design, construction and operation of industrial architecture as an inherently collaborative process.

In turning to the role of the occupants of these buildings, labor issues should also pervade any understanding of these places. Workers and neighborhood residents would certainly have had different perceptions of Buffalo's grain elevators than Gropius or

Corbusier did, and it is essential to highlight those differences wherever possible. In scholarship, industrial structures are presented differently in labor histories than they are in architectural histories. While the architectural canon tends to marginalize these places by emphasizing only their technical innovations, labor discussions marginalize these structures perhaps because of their technical nature. Laborers are often sidelined in the historiography of industrial architecture, just as architecture has been marginalized from the historiography of industrial labor relations. In labor histories, they are places that dehumanize, or machines that alienate and endanger their workers due to their complicated technologies. Some labor historians such as William Adelman, James Green and Alan Dawley have diversified the approach to these buildings, presenting them as places of gainful employment or even beacons of hope.[22] Photographer Milton Rogovin, together with public historian Michael Frisch, has demonstrated the potential for providing labor perspectives in industrial photography in *Portraits of Steel*.[23] Images in this collection, alongside transcribed oral histories, emphasize the laborers in Buffalo's industrial neighborhoods, depicting the city's industrial structures using the community gaze rather than concrete and steel. While this dissertation is firmly rooted in an exploration of architecture and urbanism, rather than labor history, it aims to incorporate labor studies into this discussion and demonstrate the potential for interdisciplinary work across these boundaries in the future.

Methodologically, it can be challenging to incorporate the experiences of laborers and nearby residents as they historically engaged with these buildings around the turn of the century. Archives usually do not include any substantial materials produced by these individuals, and their appearance in journals and magazines is even more rare. Aside from the very occasional mention of these spaces in personal diaries and scrapbooks, laborer perspectives on this subject are inherently invisible in historical records. Archival evidence in this realm is therefore very scarce, and scholars who aim to incorporate these perspectives are left without clear means of piecing together laborer experiences and perspectives. While it may be difficult, or in many cases nearly impossible, to find archival records of a laborer's direct experience, scholars must attempt to find ways to subvert this employer-dominant version of history nonetheless. By reading between the lines of company newsletters, union records, and promotional materials, however, it is possible to at least acknowledge the ways in which laborers were presented in relation to these buildings. Professional journals and trade publications, for instance, frequently described daylight factories in terms of their work flow, and the laborer emerges in these narratives in subtle, even perhaps unintended, ways. Furthermore, photographs provide insight into the relationship between laborers and the buildings where they worked, serving as a glimpse into the daily conditions of workers even if through the careful lens of the photographer.

Framing Multiple Views

Viewing this industrial architecture through multiple lenses, the incorporation of visual media and visual analysis is also fundamental to the methodology of this study. As industrial structures increasingly crowded the city skylines at the turn of the twentieth century, the public looked to various media to make sense of these new buildings. Magazines, newspapers, photographs, postcards and tours all played a role in interpreting these places, providing visual, textual and experiential encounters that would shape the public perception of industrial architecture for decades to come. Artists also produced multifaceted visions of industry in a variety of media, with Precisionist paintings such as Charles Demuth's *My Egypt* emerging at the same time as popular representations in general circulation magazines, advertisements and promotional materials. Well-known examples of these visual influences include Charles Sheeler's Ford-commissioned images of the Rouge River Plant and Margaret Bourke-White's photographs of Fort Peck Dam, both of which were reproduced for the masses in *Life*. Paintings and photographs of industrial architecture pervaded both high art and popular culture in the first decades of the twentieth century, greatly impacting the public perception of these buildings in powerful yet subtle ways.

Much like professional architects, the general public often encounters architecture first through the medium of photography, rather than through architecture itself. Photography is a central form of architectural education, and its influence on students, professionals, and scholars is persistent and pervasive. It translates a three-dimensional, site-specific medium-architecture- into one that can be circulated globally in two-dimensional form. In most cases, to view architecture is to view photographs of architecture. This is a logistic necessity, but one that is also saturated with interpretive influences. Camera angle, physical context, lighting and color all effect the construction of an image, and that does not even include the editing process that occurs after the initial exposure. Scholarship has long reminded us that photography is a persuasive illusion of truth, yet it seems we still need some reminding. Many architectural historians still illustrate their textbooks with photographs of buildings, choosing images that best illustrate their point without acknowledging the subjective influences of those images.

Far from transparent illustrations, photographs effect the public perception of architecture in a multitude of ways, shaping education and even constructing aesthetic opinion. For this reason, it is essential that we look not only at the images, but also at the lens used to construct them. Only in doing so can we gain a more thorough understanding of architecture through the context of its mediation.

Several scholars have produced works on architectural photography, examining the impact of visual representation on structural understanding. Peter Hales' *Silver Cities* ushered in a new generation of scholarship on the visual city, one that combined thorough visual analysis along with cultural and historical research on the development of photographic technology alongside the rise of urbanity. Scholars such as Alan Trachtenberg and Nick Yablon have been particularly interested in the cultural aspects of this subject, examining their impact on the continual evolution of American architecture and identity.[24] Mary Woods' *Beyond the Architect's Eye* examined this topic through the lens of multiple photographers in different eras of the twentieth century, providing a geographic and temporal diversity to the field.[25] Her emphasis on female photographers such as Frances Benjamin Johnston and Marion Post Wolcott, her inclusion of vernacular architecture, and her detailed visual analysis has greatly influenced my own approach to this dissertation. As my primary advisor on this work, Woods has done much to shape my own lens.

While these scholars have established a vital discourse on the visual mediation of architecture, they have thus far tended to focus primarily on commercial, institutional or residential structures. Industrial buildings such as factories and warehouses have been shaped through images in some of the same ways, but the field of architectural history has only begun to develop this conversation. Two of the most influential texts on the topic emerge from the fields of American Studies and the History of Technology, as Leo Marx's *Machine in the Garden* and David Nye's *American Technological Sublime* have each made significant efforts to bring these issues to light.[26] Both of these scholars examined the intersections between imagery and industry, between man and machine, between nature and technology, each of which is a reoccurring theme that emerges in this work. Applying the topic to a more specifically architectural discipline, this dissertation examines the ways in which images have contributed to the public perception of industrial structures, and the shifting meaning of 'industry' itself in a place like Buffalo.

Photography works together with tourism to expand and contract these local and global experiences of place. Tourism and photography are intertwined, creating a perpetual cycle of site recognition and visual reproduction. As photography disseminates architecture around the globe, and tourism in turn recruits those global viewers to a specific locale, producing more photographs as souvenirs. Erich Mendelsohn's experience visiting Buffalo's grain elevators in the 1920's attests to this relationship. In his journals, he wrote of his visit: "I took photographs like mad. Everything else seemed to have been shaped interim to my silo dreams. Everything else was merely a beginning."[27] The act of traveling, of touring architectural sites, has become synonymous with the act of photography, echoing Susan Sontag's assertion that "to collect photographs is to collect the world."[28] In this sense, this scholarship examines both of these forms of media- photography and tourism- in order to gain a more complete 'image' of the public interaction with these industrial places.

Tourism has also largely shaped the public understanding of industry, both at the height of the industrial era and today's postindustrial one. Factory tours at the turn of the century were largely instrumental in translating the new role of industry in American cities. Corporations such as Heinz, Ford, and the National Cash Register company opened their doors to tourists in an effort to promote their industrial processes and products. In an era of corporate mistrust, concerns for food purity and labor welfare, these tours above all promoted the benevolence of industry in modern society. Serving as part advertisement, part education, and part entertainment, early twentieth-century factory tours were largely influential on the perception of industrial architecture for decades to come. Furthermore, tourists served as an entirely different form of inhabitant in these spaces as laborers did. Occupying physical infrastructure that was designed specifically to accommodate their presence, tourists experienced industrial buildings in unique ways that were carefully constructed to guide their viewpoints and perceptions. Often gazing directly at workers from these vantage points on their guided visits to these buildings, tourists experienced these spaces simultaneously, though differently, from the laborers who also inhabited them.

Despite the immense popularity of early twentieth century industrial tours, scholarship on the subject has been mostly peripheral. Often mentioned only briefly in context of a corporate history or advertising analysis, factory tours are rarely studied in significant detail. Corporate biographies can provide insight into factory tours, such as Robert Albert's analysis of Heinz, which illuminates one example in depth in ways that are ripe for comparison with other places.[29] Tour souvenirs, pamphlets, photographs and postcards inevitably serve as some of the primary sources for research, in part due to the ephemeral nature of tours. These visual and textual sources provide important insight into the experiential qualities of tours, and careful analysis of these documents can enable scholars to extend this research into a more sensory realm. Allison Marsh's study of picture postcards from a diversity of American industrial tours in *The Ultimate Vacation: Watching Other People Work* and John Stilgoe's *Metropolitan Corridor* exemplify the potential of this approach, allowing scholarship to simultaneously root historical analysis in visual media while also expanding beyond it into the experiential realm.[30]

More broadly, tourism studies have emerged more often from the social sciences than from architectural disciplines. Sociologist Dean MacCannell produced *The Tourist* in 1976, and it still forms the foundational bedrock of cultural tourist studies today.[31] John Jakle, John Urry, and Catherine Cocks have each contributed important terminology and systematic ways of identifying tourist motivations, practices and patterns.[32] Focusing more specifically on architectural tourism, two edited collections, by D. Medina Lasansky and Brian McClaren and Joan Ockman and Salomon Fausto, have urged a new generation of scholars to incorporate the subject into the discipline.[33] By viewing tourism as a vehicle for the performance, experience or sensory understanding of the built environment, architectural historians can and should contribute more significant analyses of this underexamined topic. While the lack of thorough architectural works on the subject is discomforting, it can also provide an excellent opportunity to reconsider notions of architecture not as an object, but as a malleable experience. Methodologically, the study of industrial architourism provides scholars with an opportunity to incorporate the physical experience of these spaces in new ways. Following the sensory turn in scholarship exemplified by Emily Thompson in *The Soundscape of Modernity*, this methodological approach seeks out the sounds, smells, sights and other physical experiences that tourists encountered on their visits to these industrial buildings.[34]

Today, tourism still creates important cultural encounters with industrial architecture, although in vastly different ways from its twentieth-century counterparts. The Epilogue of this dissertation addresses the increasing popular interest in Rust Belt cities like Buffalo today, as tourists flock to cities like Detroit, Cleveland, and Buffalo to take tours, both official and unofficial, of formerly industrial structures. While a century ago they came to view the mechanical marvels of places like automobile factories, train terminals and cold storage warehouses, today they are visiting these places again, but seeking the allure of abandonment rather than productivity. Although the popular press has been quick to address this growing trend in postindustrial ruin tourism, only a few scholars have touched on the subject directly. Geography scholar Tim Edensor's *Industrial Ruins* provides an excellent example of the potential for this topic, examining the allure of these spaces as one that amplifies the sensory experience of architecture and encourages unscripted play amidst an otherwise highly regulated urban society.[35] In Detroit, architectural historian Andrew Herscher took a different approach to incorporating tourism into scholarship, creating *The Unreal Estate Guide to Detroit* in order to provide an alternative guidebook to some of the city's reuse projects rather than solely viewing the negative aspects of its industrial ruins.[36] Both of these scholars frame this subject through the lens of potential rather than pessimism, and doing so has opened up a diversity of interpretations that could impact not only the public understanding of these structures, but also envision new uses for them. Rather than focusing on the loss of industry these ruins can represent, derelict American factories offer an opportunity to study ruins as places of play and subversion, of curiosity and sensory experience, and of the struggle to simultaneously remember and forget. They are the physical manifestations of a nation seeking roots in a relatively young history while also embracing the freedom and flexibility that that very youth allows. Due to this youth, American industrial ruins offer a wide range of alternative perspectives that have been thus far underexplored in architourism scholarship.

Alongside this quest for new historical interpretations is a contemporary urgency to apply these findings to urban revitalization strategies. In this context, my passion for this place is paired with a commitment to public history and urban redevelopment as well as academic scholarship. My own particular lens on this material has been greatly informed not only by my academic training, but also by my experiences working in Buffalo in the fields of historic preservation, real estate development, and community activism. Supplementing my own academic background in urban planning and architectural history, my role as an architectural historian has been directly influenced by my professional involvement in preservation-oriented redevelopment throughout Buffalo. Having worked at multiple preservation firms in Buffalo for the past eight years, my historical understanding of these buildings is undoubtedly colored by a contemporary awareness that they face an uncertain future, and as an active agent in envisioning that future. While writing this dissertation, I was often simultaneously working with developers and architects in order to rehabilitate similar industrial structures in order to put them to new use and revitalize surrounding communities. As Buffalo currently experiences a boom in construction and redevelopment today, the majority of the structures undergoing rehabilitation can be classified as industrial architecture. Working directly with developers, I became very aware, both as a preservation professional and an architectural historian, that the current revitalization of this city is rooted in its industrial past.

Uncovering that industrial history was therefore vital to me from two different, but overlapping perspectives. These different identities have informed and even challenged each other in determining which story to tell. As an architectural historian, I recognize that the history of Buffalo's industrial architecture can challenge or expand the academic canon. As a preservationist working with developers in the city today, I also know that same history could have a very real impact on the built environment of the city itself. Due to my overlapping roles as both a professional and as an academic, I offer this dissertation with a distinct awareness that this history can also be relevant to the city as it evolves in the present day, and that my own work in this realm is implicated in these contemporary issues.

With one foot in the ivory tower of academia and one foot in the crumbling asbestos of industrial ruins, this work attempts to straddle the realms of scholarly analysis and practical applications. In doing so, I only hope that this research will prove useful to other historians, as well as practicing planners, preservationists, educators and developers that can embrace this multifaceted industrial past while also playing a significant role in the city as it continues to evolve. From a preservation standpoint, what is the role of industrial structures now that they are no longer industrial? And from a historical perspective, what should the role of the industrial past play in shaping the postindustrial future? This dissertation is an attempt to grapple with these questions using Buffalo as a case study, demonstrating not only their local importance but also their national and international relevance as the city moves forward into an uncertain but optimistic postindustrial era.

During this process of Rust Belt reinvention, industrial architecture takes on new physical forms and cultural meanings, making this history ripe for reinterpretation during Buffalo's so-called renaissance. In order to understand the postindustrial identity of the Rust Belt today, this dissertation broadly examines the ways in which Buffalo has been branded as industrial over time- through the perception of architecture as shaped by its design, imagery and tourism. This analysis has never before been so timely, as current visions for the 'new' Rust Belt are underway, compelling historians to find new ways to interpret industrial heritage during this crucial moment of reinvention. Examining both historic and contemporary images of industrial architecture in Buffalo, this dissertation also traces the ways in which an industrial 'image' has impacted urban identity. Images can often serve not only as interpretive records of the past, but also visions for a future that has yet to be enacted. Images can impel action, as Hales has demonstrated, where "images race ahead of circumstance in the hopes of giving rise to what it imagined."[37] I hope that in writing this dissertation, I too can paint an image of the Buffalo that has not yet come to be, but is rooted in the Buffalo that once was.

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CHAPTER ONE

The Grain Elevator:

Structural Legibility and Steel

In 1931, the headline, "Grain Elevators Copy Skyscrapers," appeared in *The Boston Globe*, addressing the shared application of concrete by both building types in order to soar to unprecedented heights.[1] While this article notably compared the grain elevator and the skyscraper long before many others, the headline also communicated a simplistic, and even false, history when implying that skyscrapers provided the initial impetus for grain elevator design. Both of these building types developed over a series of overlapping stages, experimenting with brick and then steel before using reinforced concrete. A closer examination of this material evolution reveals that the grain elevator and the skyscraper underwent some of these structural innovations at roughly the same time, particularly during their contemporaneous early manifestations in steel in the last decade of the nineteenth century. The developments of steel grain elevator bins and of early steel skyscraper construction were deeply intertwined, and both experienced pivotal moments of innovation in Buffalo in the years surrounding 1897. This chapter compares the monumentality, materiality, structural composition and visual representation of these two building types as they were both developed and perceived by architects, engineers and artists at this time. In doing so, this chapter contributes the first substantial comparison of the grain elevator and skyscraper by an architectural historian to date.

The history of these developments is as much about these two building types as it is about the evolving professional roles of the architect and engineer, brought on at least in part by the emergence of these building types themselves. Taking a closer look at that history, this chapter will not only prove the error in that newspaper headline, but will also demonstrate the role of print and visual media in negotiating these structures in the American urban landscape. The textual and aesthetic presentation of both grain elevators and skyscrapers in many professional journals, popular magazines, and artworks reveals a constant pursuit of structural legibility. These materials demonstrate an interest in seeing *through* these structures, in understanding their inner functions from their exterior appearances. In doing so, they reveal as much about the quest for structural legibility as they do about the structures themselves.

The search for 'building clarity,' which in this case refers to a transparency of form, or the illusion of one, is evident in many of these representations of Buffalo's grain elevators. Although their iconic steel and concrete bins were quite literally opaque, architects and engineers on both sides of the Atlantic viewed grain elevators as architecturally transparent in a more conceptual sense, not in the material sense but for their structural honesty and legibility instead. The ability to understand these structures by simply looking at them was at the root of many architects' fascination with them, and while they often misunderstood the technical details of how these buildings functioned, they were enamored with their seemingly pure, legible form. The 'building clarity' of these grain elevators will be examined throughout this chapter, wherein the term clarity primarily refers to the supposed structural legibility of their design.

The chapter is divided into three main parts, each with subsections that address more nuanced aspects of the topic at hand. Part One establishes a comparison between the grain elevator and the skyscraper, tracing the technological developments that led each building type to this historical moment of intersection in Buffalo. Part Two examines the impact that the grain elevator and the skyscraper had on the transformation of the building professions- particularly architects, engineers and general contractors. Journals not only provide excellent insight into this period of professional change, but also played a fundamental role by separating, uniting or reinforcing the relationships between professions and the buildings themselves. After examining professional views of these building types in Part Two, Part Three examines the grain elevator and the skyscraper through a different lens, using paintings created by two American artists, Charles Demuth and Georgia O'Keeffe, to explore the role these two building types played as national icons. Together, occupational journals and artistic interpretations shaped professional and public understandings of grain elevators and skyscrapers. In doing so, they created an intricate web of structural and cultural transparencies that were often as simultaneously lucid and opaque as the buildings themselves.

Part 1: A Port of Entry

To discuss grain elevators is to discuss Buffalo, which still has the largest extant collection of grain elevators in the world.[2] As historian Lynda Schneekloth rightfully asserts, "The entire history of the transformation of the urban elevator – wood to tile to steel bin to reinforced concrete – is represented by the elevators in the Buffalo."[3] The differences between these 'urban' grain elevators and rural grain silos are somewhat nuanced, but these differences also associate them with disparate parts of the country and its complex chain of operations in the grain process. Grain silos are more common in the Midwest or other heavily farmed areas, where harvested corn, barley or wheat is stored until it is later distributed to other areas. In contrast, grain elevators are more often seen in urban areas, particularly at transportation hubs such as Buffalo. While silos only store and weigh the grain, elevators can also receive, weigh and transport it along water or rail, process or grind the grain into products like flour, and provide hubs for the grain industry to trade or distribute products. Elevators contain silos, however, typically in the form of tall cylindrical bins used to store the grain between processes or transportation transfers. Offering more functions, grain elevators are architecturally more complicated than silos, as they not only store but also process and transfer the grain. In this sense, they serve as an urban version of the rural grain silo, and would have been recognizable as a structure associated with the grain industry by most people.

As industry seeped into agricultural practices, and cities, during the late-nineteenth and early-twentieth centuries, the grain elevator played a significant and even symbolic role in suturing together the two seemingly separate realms. Serving as a visually connective link between farms and factories, the grain elevator could blur the boundaries between rural and urban America at this critical time. In order to trace the transformation of the grain elevator even briefly, it is necessary to first examine the converging factors that led to the invention of the elevator in Buffalo in 1842. While many have noted the grain elevators for their impact on the development of modernism, the actual inner workings of a grain elevator are still mystifying to some scholars and the general public. A few dedicated historians have already outlined the technical processes of grain elevators in great detail, but it is worth addressing the basic functions and origins of this typology before examining it from other angles.[4]

Geography played an essential role in the development of the grain elevator in the early nineteenth century. Situated at a confluence of waterways, Buffalo emerged as a city at the crossroads of the East Coast and Midwest. Positioned at the eastern edge of Lake Erie and the western edge of New York State, Buffalo quickly became a vital shipping and transportation hub. Several rivers flow through the city, enabling ships safe passage into the city's many harbors rather than solely on the edge of the lake. In the early nineteenth century, shipping via waterways was substantially more affordable than shipping goods by land. In 1804, the year Buffalo was founded as a city, the cheapest and most common way to send grain from Buffalo to New York City was by shipping it across the Great Lakes, down the Mississippi River, through New Orleans and then up the Atlantic Ocean. This lengthy and indirect route took roughly six months and cost approximately $30 per ton, whereas sending grain directly overland from Buffalo to New York City via New York State cost nearly $100 per ton.[5] The poor conditions of roads and overland shipments was soon remedied by the construction of the Erie Canal in 1825, which solidified Buffalo as a fundamental city located at the western terminus of the canal. This manmade waterway, combined with the several waterways naturally flowing through and around the city, ensured that Buffalo would become, and remain, an essential hub between the east coast and the Midwest for decades to come.

Grain was the largest market in Buffalo's shipping industry, and it was funneled from the breadbasket of the Midwest to New York City and the East Coast through Buffalo. In the early nineteenth century, the process of transferring grain from great lakes vessels to boats on the Erie Canal was slow, inefficient, and therefore not nearly as profitable as it could be. Grain was typically bagged in sacks and transferred bag by bag by individual laborers from vessel to vessel. This backbreaking work was extremely slow, and it would often take several days to unload a vessel, crowding the waterways and causing massive delays. The grain elevator arose in response to this demand for a better system, in order to weigh, transfer and store grain in between shipping vessels.

In 1842, an entrepreneur named Joseph Dart invented the grain elevator in Buffalo, introducing a system that drastically reduced the number of laborers required to transfer grain and expedited the process tenfold. Urban manufacturing, rather than rural agriculture, provided the initial inspiration for this innovation, as Dart based his initial plans on Oliver Evans' design for a steam mill in Delaware. Dart, along with the-often-forgotten engineer Robert Dunbar, devised a plan for the grain elevator that blurred the lines between building and machine. The basic functions of this initial grain elevator were rudimentary but effective, and can still be seen to some degree in the modern grain elevators that came in the generations after this original design. Dart's first elevator consisted of a wooden structure that provided storage space for the grain, accompanied by a steam driven belt that had buckets attached to it. Rather than relying on laborers to lift the grain bag by bag, the belt would be lowered into the ship in a manner that effectively made this portion of the structure the first 'marine leg,' as the device would come to be called in subsequent structures. This marine leg was outfitted with buckets that would scoop up the grain and load them into the wooden structure. This drastically reduced the time required to unload a shipping vessel, as Dart's first elevator could unload 1000 bushels an hour. Three years later, this rate was doubled. In the span of just a few years, Dart's elevator system had dramatically changed the pace and storage capacity of the grain industry. Just fifteen years after the first elevator was built, ten more were in operation near the Buffalo harbor, with a combined storage capacity of 1.5 million bushels. Buffalo quickly became the world's largest grain port, surpassing much larger European cities such as London and Rotterdam.

The invention of the grain elevator not only had a notable impact on the history of architecture and engineering, but also was largely responsible for establishing Buffalo as a major American city. The growth of the grain industry, like the city, was exponential. By 1850, Buffalo had become the largest grain and flour market in the United States, and would remain so until Chicago grew larger in size during the 1880s.[6] By 1855, Buffalo's grain elevators had transshipped a total of 19,788,473 bushels of grain, which meant that half the grain in America went through Buffalo in that year.[7] Just a few years later in 1859, over 51 million bushels of grain were transshipped in Buffalo, which is roughly enough to provide a year's worth of food for 10 million people. In 1865, the *Commercial Advertiser Directory for the City of Buffalo* reported that, for the second year in a row, the Port of Buffalo was the world's largest grain depot. Put simply, to think of Buffalo in the nineteenth and early twentieth centuries meant to think of grain and grain elevators.

With numbers increasing at this volume, grain elevator design and technology was continually revised in order to provide greater efficiency and storage space in an increasingly dense industrial waterfront space. The rapid development of railroad lines during this time further solidified Buffalo's role as a shipping and transportation nexus, and more than thirty different railroad lines utilized the city's extensive network by the late 1800s.[8] The terminal grain elevator became a fundamental subtype of this typology, designed specifically to incorporate rail lines by transferring grain directly from a shipping vessel on the waterfront to a railroad car on land. Situated between a waterway and a railroad line, elevators like the Connecting Terminal complex represents just one example of the evolution of grain elevator design to suit new external technological demands. With a marine leg on one side and rail access on the other, terminal elevators were essential structures in the process of transferring grain from a shipping vessel to an overland railroad car.

The grain elevator continued to transform throughout the nineteenth and early twentieth centuries, incorporating a number of design solutions in order to improve structural function, efficiency and durability. Many of the catalysts for improvement were related to the erratic behavior of grain, which created a number of problems for the engineers hired to design increasingly large and complex elevators. In bulk quantities, grain acts more like a liquid than a solid, creating two main pressure forces on the walls of a grain elevator. In order to accommodate the pressure that loose grain exerts both downwards and laterally on the retaining walls, grain elevators must be quite tall.

Furthermore, bulk grain is highly flammable. Grain dust, particularly when placed in close quarters with steam powered or electric powered equipment, can create explosions and fires at a moment's notice. Fireproofing was a major concern in the history of transformations that grain elevators, and many other building types, underwent from the nineteenth to the twentieth centuries. This concern is particularly evident in the material evolution of the grain elevator, which began with Dart's wooden elevator, and then experimented with steel and tile forms at the turn of the twentieth century before creating the reinforced concrete elevators that dominated early-twentieth-century construction.

In the years surrounding World War I, several reinforced concrete elevators were built in Buffalo, each surpassing the last in size. In 1917, the Concrete Central Elevator was built along the Buffalo River with a capacity of 4.5 million bushels. As a terminal transfer elevator, it featured three marine legs on the waterfront side that could unload three marine vessels at a time, and the rail side enabled crews to load and unload twenty rail cars in a single hour. The sheer scale of the Concrete Central Elevator was made possible by the use of reinforced concrete, and at the time of its completion, it was the largest grain elevator in the world.

By 1931, Buffalo had thirty-eight working grain elevators with a combined capacity of over 47 million bushels of grain. Just one year later in 1932, the Welland Canal was extended to connect Lake Ontario to Port Colborne on Lake Erie, threatening Buffalo's role as a crossroads city for grain. Due to the enormous amount of infrastructure in place, however, Buffalo continued to play a vital role in the national grain market for two more decades, reaching its height in the mid 1950s. In 1959, however, the opening of the St. Lawrence Seaway forever changed the geographical advantages that Buffalo had in the grain market, and the industry continued to decline into the early twenty-first century. The year 2002 marked the end of an era, when the last grain scooper in Buffalo, and the world, finished his final day's work.

Today, however, there are still a few major grain elevators still operating in their original function. These include the former Washburn Crosby complex, now operating as General Mills, where most of the nation's Cheerios cereal is still made. By 2003, the majority of Buffalo's remaining grain elevators had been placed on the National Register of Historic Places and been thoroughly documented by Historic American Buildings Survey (HABS) and the Historic American Engineering Record (HAER). Additionally, the grain elevators have undergone revitalized public attention in a new context, and many are currently being repurposed for artistic installations, cultural events, and historic tours. These efforts reflect a strong public curiosity about these structures, demonstrating a need for more thorough introductions to these spaces and their rich historic context.

Over roughly a century, the grain elevator underwent numerous technical, structural and formal innovations to improve efficiency and capacity. While some scholars have addressed both the early and the late phases of these innovations, few have considered the intermediate phases in any depth.[9] Viewed in terms of material evolution, the era of steel grain elevators marks an important turning point between the early grain elevators constructed of wood in the mid-nineteenth century and those made of reinforced concrete in the early twentieth century. The years from 1895-1900 witnessed a particularly boisterous construction period in Buffalo, and two steel-bin elevators built during this time inspire a closer look later in this chapter.

In Buffalo, the era of steel elevators marked a pivotal moment in both the history of this typology and the city's own history. The harnessing of Niagara for hydroelectric power in November 1895 made an immediate impact on Buffalo's industrial sector, attracting many businessman, entrepreneurs and engineers to the region in the hopes of utilizing Niagara's abundant and affordable electricity to power their factories. This industrial boom created a ripple effect that could be seen in other sectors, as commercial, cultural and artistic endeavors also began to flood Buffalo's downtown at this time as well. Dozens of industrial buildings were constructed in the Buffalo area in 1895, yet many other important buildings were also erected for commercial purposes during the same year in other parts of the city. Only a few blocks away but a world apart from the bustling industrial waterfront, notable office buildings began to tower in the city's skyline beginning in 1895. The Ellicott Square building, designed by the D.H. Burnham & Company, became the largest office building in the world when it opened to the public in early 1896, and Adler and Sullivan's Guaranty building (now known also as the Prudential building) opened as one of the world's first steel framed skyscrapers, just across the street. Several factors contributed to this cluster of construction, and the sheer number of architecturally significant buildings erected during this time attests to the prosperity of Buffalo at the turn of the twentieth century.

Buffalo's construction boom occurred at a time when steel was becoming the preferred material for constructing tall buildings in increasingly dense urban environments across the nation. Since the completion of William LeBaron Jenney's Home Insurance Building in Chicago in 1885, iron and then steel construction had attracted attention from architects and engineers alike. Although the material was still gaining traction with more traditional, Beaux Arts trained architects, many were drawn to its flexibility and lightness, which enabled more light and air to enter buildings than the load bearing brick walls. Initially used primarily by engineers in the construction of bridges or other infrastructural elements, steel quickly became an architect's material in the decades leading up to the turn of the twentieth century. Furthermore, the steel industry played a role in promoting, incentivizing and developing these new architectural forms, as manufacturers worked with architects, engineers and general contractors as they developed their designs. Steel provided a common thread linking commercial and industrial architecture at this time, as can be seen in the simultaneous erection of steel skyscrapers and grain elevators during the years surrounding 1895. Steel was at the core of these two major architectural developments in Buffalo, as well as in similar developments in places like Chicago, Detroit, and Pittsburgh. The intricate relationship between the grain elevator and the skyscraper will be further examined in this chapter, but first a closer examination of this intermediary grain elevator period, the brief but essential era of steel bin elevators from 1897 to the early 1900s, will be discussed in more depth.

The material evolution of skyscraper design coincided with remarkably similar steps in elevator construction, first experimenting with wood and masonry, then graduating to steel framing techniques in the 1880s-1910s, until finally embracing reinforced concrete in the first decades of the twentieth century. While the grain elevator emerged as a building type before the earliest American skyscrapers, they both underwent material transformations at roughly the same time. After decades of wood and brick grain elevators built in the Dart style since the 1840s, the erection of the Electric and Great Northern marked the beginning of an era of steel in 1897. Steel elevators continued to be built in Buffalo and beyond into the early 1900s, marking a brief but momentous transitional period in the history of elevator design. While the engineer Charles Haglin built the first reinforced concrete elevator in Minneapolis as early as 1899, known as 'Peavey's Folly,' it was not until 1906 that they appeared in Buffalo, beginning with the American elevator complex. By 1915, the appearance of the Concrete Central, the largest elevator complex in the world at the time, marked the dominance of reinforced concrete in elevator design henceforth.

The timeline for early skyscraper design mirrors that of grain elevators, as they experimented with steel and concrete roughly contemporaneously to one another. Chicago dominated the earliest skyscraper developments, especially once the Great Fire of 1871 had destroyed large swaths of the downtown and left these areas ripe for new forms of construction. Buildings in the 1880s were usually considered skyscrapers at ten stories tall, but by the mid 1890s they were soaring to twenty feet. This exponential growth spurt was made possible in large part by the adoption of steel for framing purposes, which freed designers from masonry and allowed more light and open floor space. By 1895, *Engineering Record* declared, "cast iron could not be recommended any longer," favoring steel framing in the construction of skyscrapers instead. Another journal emphasized this development, stating "The steel skeleton is as important to a high office building as the bones are to the human body, for the steel framework bears all the weight and all, or nearly all, the strains on the building."[10] In that same year, Burnham and Root built the Reliance building using steel skeleton construction methods, enabling large panes of glass supported by load bearing walls that mark an early precedent for the modern glass skyscraper prevalent in cities today that was to dominate the twentieth century.

While Chicago developed the earliest models of steel skeleton design, New York skyscrapers towered higher than ever before due to the increased use of steel framing after the turn of the twentieth century. Burnham's Flatiron building was twenty-two stories high when it opened in 1902, quickly eclipsed by the Singer, the Metropolitan Life Insurance Tower and the Woolworth Building in 1908, 1909 and 1913 respectively. The latter soars to 792 feet high, providing nearly sixty stories of office space, demonstrating the incredible impact that steel made on the development of the American skyscraper. Yet by this time in 1913, grain elevator design had moved away from steel and begun to fully embrace reinforced concrete as a more suitable material for its purposes. The first reinforced concrete skyscraper however, the Ingalls building in Cincinnati, was constructed in 1903, but the material did not gain significant traction with skyscraper designers as a primary material until several decades later. The era of steel lasted much longer in the history of skyscraper design than it did in elevator design, yet both first appeared at the same time.

In Buffalo, the appearance of the first steel framed skyscraper and steel grain elevator bins was nearly simultaneous, marking a significant moment before these two typologies parted ways. The Guaranty Building opened in the fall of 1895, followed only a few months later by the completion of the Ellicott Square Building in spring of 1896. Designed by Dankmar Adler and Louis Sullivan, the Guaranty Building stood thirteen stories high at the northeast corner of Church Street and Pearl Street. The building, a sister to the Wainwright Building erected in St. Louis in 1891, was constructed with a steel frame skeleton clad in terra cotta exhibiting Sullivan's nature-inspired designs. Just a block away on Main Street, Daniel Burnham's Ellicott Square building was three stories shorter than the Guaranty Building at ten stories tall, but its square footage represented the largest office building in the world at the time of its opening. Burnham's engineer, Edward Shankland, used steel frame construction with reinforced concrete piers to provide the massive building with plenty of light. A central internal courtyard exhibited mosaic floors, illuminated by plenty of light let into the center of the building from the intricate steel framed skylights above. The appearance of the Guaranty and the Ellicott Square buildings on the Buffalo skyline in 1895-96 marked the beginning of the steel skyscraper era for the city, as several others would be built in the next decade. Both of these buildings were met with great acclaim, and Buffalo had fully established itself as a nexus for trade and commerce by 1900. Just one year later and one mile away down the waterfront, the completion of two pivotal grain elevators in 1897 similarly marked the beginning of an era of steel construction for this building type.

Buffalo's waterfront contains two excellent examples of steel grain elevators from this intermediate phase of design, the Great Northern elevator and the Cargill Electric Elevator. Both were constructed in 1897, and together they represent the first elevators in the nation designed to utilize electricity, provided by Niagara Falls. They share much in common, but located about one mile apart from one another, their designs essentially bookend two vastly different approaches to form during the era of steel. As Banham noted, the Great Northern "stands at the end of the line that had started with the simple shed of Joseph Dart's first elevator- a building filled with bins."[11] Where the Great Northern stands at the 'end of the line' of the earliest elevator forms, the Cargill Electric marks the beginning of the next phase, as a pivotal example that readied future designers for the modern elevator. Although they were constructed just yards away and days apart, the Great Northern and the Cargill Electric together demonstrate opposite ends of the design spectrum that occurred in this brief, but essential, period of steel grain elevator construction.

The Great Northern Elevator

Located on the east side of Buffalo's outer harbor, the Great Northern (Figure 1) was designed by Max Toltz and D.A. Robinson, both of whom were employed by the Great Northern Rail Company based in Minnesota. Toltz and Robinson more closely resembled engineers than architects by today's standards, and they approached the Great Northern design with goals for massive capacity and material innovations in mind. Toltz, who had previously designed bridges, also designed two other elevators for the company from 1896-1901, in Duluth, Minnesota and West Superior, Wisconsin. These, along with the Great Northern in Buffalo, were all enormous for their time, with more than 2 million bushels capacity each. The dimensions and materials of the Great Northern were celebrated by many professional journals at the time, as *Engineering News* proclaimed, "The great increase in the capacity and mechanical equipment of grain elevators, combined with the substitution of steel for timber in their construction, have placed these structures among the most important engineering works of modern times."[12]

Inside, forty-eight cylindrical steel bins stand on massive eighteen-inch steel beams, hovering several feet above a concrete floor where they would unload onto a conveyor belt. The bins, composed of several plates of steel welded together into a conical form, come in two different sizes to address diverse needs. Thirty of the bins were designed to hold 70,000 bushels of grain each, and the remaining eighteen bins held smaller amounts in order to accommodate smaller shipments. This size separation technique became much more common in the concrete phase of elevator construction that was to come in the following decades.

The shape of the individual bins required an innovative approach for positioning them within the structure. Using cylindrical bins, rather than the rectangular ones that typified earlier elevators, required new arrangement solutions in order to maximize storage capacity. Cylindrical bins could hold only eighty percent as much volume as rectangular bins, and therefore their placement within the rectangular elevator structure needed to utilize as much space as possible in order to compensate for this loss. The solution to this issue was to squeeze smaller bins into the interstitial areas between the larger bins, as seen in Figure 2. Thirty large bins were lined up in rows of ten, with eighteen smaller bins placed in the spaces between the larger ones. This not only provided various sizes to store grain depending on the load of the shipment, but also ensured that valuable square footage would not be wasted. Additionally, twenty-six even smaller bins were later added to the exterior rim between the thirty main bins and the outer brick walls. Using this interstitial bin placement, the final storage capacity of the Great Northern elevator eventually reached about ninety percent of available ground space, substantially more than previous elevators. This bin plan did not go unnoticed by Banham, who remarked that the Great Northern's "mode of dealing with the economy of space and internal transfer of grain make it one of the most remarkable buildings in the present study."[13] The spatial efficiency of this box, containing multiple sizes of cylinders packed into a rectangle, attests to the thoughtful design of these two elevator engineers in response to the specific technical and economic demands of the grain industry.

The steel head house at the top of the structure is clad in corrugated iron, and functions primarily as a circulatory and sorting center for organizing the grain bins below. An article in *Scientific American* referred to the head house as a "cupola, which is built the whole length of the main building."[14] Banham's description of the space was decidedly more poetic, as he wrote, "The head house is almost cathedral-like: long, lit by ranks of industrial windows...filled with a golden gray atmosphere of flying grain dust sliced by low shafts of sunlight."[15] The four-story structure, on top of the ten-story elevator building, indeed inspires a diverse sort of awe in its particular blend of machines and spatial design. Machinery used to control the speed and electricity of various sorting equipment was located on the top floors of the head house, whereas the second story contained twenty-seven scales used to weigh the grain in loads of 1400 bushels each. After the grain was weighed, it would travel down to the first floor of the head house to be sorted into the bins by way of ten distributing spouts. Two conveyor belts, each sixty inches wide, would move the grain along the floor to the proper spout, where it would then funnel into the chosen grain bin in the main building below. At the time of their installation, these conveyor belts were the largest in the world, each with a capacity of moving 40,000 bushels per hour each.[16] Although all of these functions required some operation and supervision by workers, the building and the equipment inside it functioned like a singular machine, completely powered by electricity from nearby Niagara Falls.

Outside, the Great Northern elevator originally featured three marine legs used to transfer grain from shipping vessels into the building where it would be weighed, sorted and stored. Each leg was housed in a steel-frame tower clad in corrugated iron, located on the twenty-four-feet wide stone dock facing the Blackwell Canal.[17] When a ship arrived at the dock, the legs would extend outwards from the towers into the hull of a shipping vessel in order to transfer, or elevate, the grain from the ship into the building for processing. When all the Great Northern towers operated simultaneously, for instance, they could elevate 60,000 bushels of grain from a ship in an hour, often unloading an entire vessel in a single workday, or several vessels simultaneously.[18] In comparison, Dart's first grain elevator, built fifty years prior to the Great Northern, had a total storage capacity of 55,000 bushels for the entire elevator. Due to this rapid unloading rate, the Great Northern was able to transship approximately 20 million bushels of grain a year.[19]

The marine leg offered many advantages to the speed and efficiency of the grain elevator. It replaced the need for hundreds of workers to transfer the grain bushel by bushel, enabling grain to be shipped and received in bulk rather than in individual bags. The marine leg drastically reduced the time it took to process grain while also processing far more than ever possible by workers' hands alone. The inclusion of a marine leg was a vital component of all grain elevators, and it first appeared in Dart's initial elevator in a more primitive form. It could be argued, in fact, that the inclusion of a marine leg is required in order to classify a structure as a grain elevator, rather than simply a storage silo, as it is the device that does the majority of 'elevating' the grain. The rest of the building components, such as the bins, conveyor belts and head house, are used primarily to weigh, move laterally, transfer, or store the grain, rather than elevate it. In this sense, the marine leg performs the primary function of a grain elevator, elevating the grain from a ship to the building using only minimal worker input.

The marine leg underwent a series of improvements in grain elevator design from its earliest inception at the Dart elevator to its first modern incarnation at the Great Northern. Dart's initial marine leg was fixed directly to the building and operated using a steam-powered conveyor belt outfitted with buckets that would scoop up the grain from a vessel and bring the full buckets into the building. At the Great Northern, this legacy was continued and improved through a number of different alterations made to this initial design. Rather than steam power, the marine legs at the Great Northern were operated by electric power. Using power generated at Niagara Falls, this was one of two of the first grain elevators to operate not only the legs, but also many of the machines and belts inside, with electricity.[20]

Another important innovation regarding the marine leg appears at the Great Northern, in the form of a 'loose' leg rather than a 'stiff' leg. Elevators built in the 1840s-1880's commonly feature a 'stiff' leg, which is fixed to the building itself. The major difference between a stiff leg and a loose leg is more directly related to the tower in which it is contained than the leg itself: a stiff leg is fixed within a stiff tower that does not move, whereas a loose leg is contained within a movable marine tower that typically glided back and forth along tracks in order to gain better access to the hull of a ship. Because the stiff marine leg is fixed to an immobile tower that cannot move laterally, it required that a vessel would move to a specific spot in order to line up its hull to the leg. This created a lot of congestion in the famously crowded Buffalo harbor, as it was difficult for large ships to maneuver precisely in a narrow space. In 1882, Robert

Dunbar, the engineer of the first Dart elevator, designed the 'loose' marine leg as a solution to this issue.[21] Tasked with building and installing two marine towers for the Connecting Terminal elevator at the mouth of the Buffalo Harbor, Dunbar invented a way to make the legs move to the ship, rather than the ship move to the legs.[22] Placing the leg in a tower as other elevators before had done, Dunbar then placed the tower on a set of rail tracks, enabling it to move back and forth for the first time. Powered by a steam engine, the marine tower containing the leg could move laterally along the tracks, with a range of about thirty feet. Dunbar built this loose leg at the Connecting Terminal elevator alongside one stiff leg, so that the loose could either move about in order to assist the stiff leg in unloading the vessel at a faster rate, or unload an entirely different vessel at the same time. The invention of the loose leg proved to be very valuable, although difficult and expensive to construct by steam power. By 1893, there were only three more grain elevators in Buffalo, out of thirty-two total existing in that year, which featured loose legs.[23]

By incorporating electricity into the design of the Great Northern from its very inception, engineers Toltz and Robinson advanced Dunbar's design for the loose leg into an even more impressive device. The Great Northern was not the first elevator to feature the loose marine leg and tower, but the scale, scope and engineering of these elements were unprecedented at the time of their appearance. Furthermore, the use of relatively new materials, particularly steel and electric power, exemplifies the ways in which this intermediate period of grain elevator design marked the beginning of a new modern phase for the typology. Set on rail tracks much like Dunbar's first loose leg fifteen years prior, the Great Northern featured three moveable towers rather than one. Placed atop thirty-two wheels each, the towers could be moved back and forth, much like the way, "that cars are operated on a cable line."[24] Constructed of steel at a cost that only a wealthy railroad company such as Great Northern could afford at this time, these towers appeared somewhat like moveable skyscrapers, towering roughly nine feet high and clad in corrugated iron. From the outside they may have appeared to move of their own accord, as tall beasts traveling along rails to lower their legs into a barge. This movement must have been a marvel akin to David Nye's notion of the 'technological sublime' for workers and onlookers alike. As local historian Timothy Bohen reflects, "the sight of massive buildings [marine towers] moving on rails must have been stunning for new immigrants coming to the [First] Ward from rural European towns."[25]

In reality, a fifty horsepower electric motor located on the ground floor inside the building was used to power the movement of the loose legs, an impressive feat in 1897. Electricity was not required in order to operate a loose marine leg, as Dunbar's earlier 1882 patent confirms, but its incorporation into the loose leg movement at the Great Northern demonstrates the great leaps that electricity enabled, marking the beginning of a new era for grain elevator design. Presently, the Great Northern has only two marine legs, as the original three were destroyed by a storm in the 1922.[26] After the storm, the Monarch Engineering Company of Buffalo, NY (who also designed other grain elevators in Buffalo, including the Cargill Pool and the Concrete Central), replaced the original three legs with the two newer, more secure ones that still stand today.

Aside from the inclusion of the moveable marine towers, the exterior massing of the Great Northern elevator does not appear to be radical, from the outside, in any way. The large structure more closely resembles a massive brick shed than a steel bin elevator, and therefore its exterior appearance is not much different from the Dart-style of elevators that preceded it. The solid brick walls reach ten stories high, almost completely uninterrupted by openings on each side. For the most part, their function is more related to environmental factors than to internal structural loads. The two-and-a-half-feet thick walls bear none of the weight of the storage system inside, and share only some of the load of the head house resting atop the structure. Instead, they act as what Banham has deemed a "pure weatherproofing skin," intended to protect the grain bins inside from extreme temperatures on the waterfront outside. One article, fittingly addressed at structural issues faced by the skyscraper instead, reflected on this same phenomenon, stating, "Since iron and steel will corrode in the atmosphere, it is necessary to cover them up, though for weathering purposes only."[27] Strong winds coming off the lake and into the harbor proved a constant threat to structural stability and corrosion, and the brick walls provided a solid break from these forces. Despite Buffalo's reputation for cold winters, it was actually the summer heat that concerned elevator designers even more than wind. When stored in bulk quantities, grain requires frequent turning in heat in order to avoid sprouting or bacterial growth, which could quickly spoil a large and valuable batch of product. Even worse, the formation of dangerous hot spots within the grain bins could lead to sudden explosion, potentially damaging the entire structure and harming the workers inside. Therefore, like every grain elevator built prior, the Great Northern provided an exterior shell forming a shed-like structure in order to protect the grain inside from dangerous weather condition. It was this wall that also divided the design of the Great Northern so firmly from the Electric Elevator, which was built in the same year.

The Electric Elevator

Located on the Buffalo River at the west end of the former Ohio Street bridge, the Electric Elevator (see Figure 3) was designed in 1897 by engineer W.E. Winn, an employee of the Steel Storage and Elevator Construction Company (SSECC) at the time. This company, initially based in Connersville, Indiana, specialized in the design and construction of steel elevators, a highly specialized task during the 1890s when steel was still gaining traction in elevator design. The company was highly esteemed when they were chosen to design the Electric in Buffalo, as one journal reflected, "the company is rapidly dotting the land with its peculiar steel-tank structures, having already built over 40 million elevators and grain warehouses, mainly in the west."[28] Erecting the Electric Elevator proved to be a monumental undertaking even for such an experienced company, particularly due to the odd size and shape of the lot it was to occupy at the edge of the river bend, and the high cost of the steel required to build the bins in cylindrical form. In order to spend more time at the construction site, the chief engineer W.E. Winn and the company's vice president F.J. Weber decided to relocate the entire company to Buffalo. *Roller Mill*, a trade journal, marveled at this move, describing that Weber and Winn were "so strongly impressed with the superior advantages in Buffalo that it was decided to make their home in Buffalo...The entire office force will be brought on from Connersville, and from this point in the 500 or more employees will be sent out in all directions on construction work."[29] This substantial business relocation attests to the centrality of Buffalo in grain elevator design in the late 1890s, where steel was quickly dominating the skyline in the form of both elevators and skyscrapers. Especially fitting for a steel construction company, the SSECC rented an office space in Sullivan's Guaranty building, newly opened when they relocated to Buffalo in 1897.

The Electric Elevator, also known as the Cargill Electric, shared much in common with the Great Northern. Similarly incorporating electric power into its design and functions, the Electric included many devices that typified elevators of this intermediate era. Nineteen steel bins were built at the Electric, with a tall corrugated iron workhouse at the wharf end and a steel frame horizontal transfer system for the distribution of grain above the five large bins, seen on the right side of image in Figure 3. This transfer system resembled a conveyor belt, connecting the marine towers and vertically-oriented main workhouse with the cylindrical steel bins via a horizontal conveyor system. Also seen in Figure 3, the Electric also featured two marine legs, one stiff leg in the tower on the right side of the image and one loose leg in the tower on the left, which Banham mistakenly considered to be the first loose leg in any elevator.[30] While Dunbar's 1882 Connecting Terminal design holds that claim instead, Banham was nonetheless correct in his assertion that the Electric Elevator was a pioneering example of several technological feats and new architectural forms. Completed in November 1897, just two months after the Great Northern, the Electric Elevator was not exactly, as Banham asserted, "the first elevator to be electrically powered."[31] The Great Northern, which opened in September 1897, beat the Electric Elevator to this claim to fame by a small window. Yet aside from that distinction, the Electric pioneered another important form, which was arguably even more influential upon subsequent designs than its incorporation of electricity.

The Electric was the first to expose the grain bins on the exterior of the elevator complex. Where the Great Northern placed massive brick walls to protect the bins inside, the Electric had none. While the Great Northern hid its interior technological advancements behind the comfort of familiar brick walls, the Electric paid an aesthetic price in being the first to expose the bins to the public. Composed of steel strips bent into cylindrical form and attached together with metal bolts, the bins were plain, squat cylinders with slightly domed tops. They do not seem to have been lined with any sort of internal casing in order to provide climate control or moisture reduction, but they were painted white from time to time in order to reduce the external heat gain from sunlight. As at the Great Northern, the bins were not all the same size, and the inclusion of various sizes allowed elevator operators to choose the appropriate bin for their particular needs. The arrangement of these bins, however, substantially differed from the approach employed at the Great Northern. There, the bins were organized in an arrangement known as the Chase system, wherein the bins are placed in straight, parallel lines in order to maximize the efficiency of the conveyor belts above as well as provide smaller interstitial spaces for more bins.

At the Electric Elevator, however, the shape and location of the lot created unique challenges for arranging the bins. The boundaries of the lot do not run back at right angles to the riverbank, and its location at the curve of a river bend creates an atypical shape for an elevator to occupy. The result of these lot constraints was a particularly odd arrangement of bins, which included several distinct but connected clusters of bins of various sizes, placed along side the main building as well as behind the wharf facade. One main set had larger bins than the other, while a cluster of even smaller bins were, as Banham described, “tucked behind the house into an awkward corner created by the geometry of the site.”[32] As elevator historian William Brown has pointed out, Winn responded to the unique conditions of the lot by "placing the grain bins behind the workhouse and its legs, not next to them."[33] This design appears to have been met with mixed reactions, which often mingled a sense of marvel at its innovative practicality with a slightly amused approach to its awkward visual results.

Onlookers found an elevator that was pioneering in its innovations, but nonetheless visibly awkward. One trade journal's response to the Electric Elevator combines two of the typical reactions to the structure, expressing both awe and confusion. Shortly after its completion in 1898, a Buffalo-based journal, *The Roller Mill,* published its reaction to the construction of the Electric Elevator just south of downtown where its offices were located. Founded in 1882, *The Roller Mill* was published and circulated each month to its subscribers, primarily industry professionals, elevator owners operators and grain traders, for fifty cents a year. Identifying itself as "A monthly journal of milling mechanics and kindred subjects," *The Roller Mill* typically included articles that featured updates on the grain industry. Oriented more towards identifying successful elevators in terms of their capacity, usefulness or economic benefits, *The Roller Mill* was usually less interested in the architectural value of grain elevators than it was in the economic value that their designs created. In this sense, the journal usually tended to shy away from specific details of how to build a grain elevator and was more interested in publishing drawings of the latest machine patents for operating inside the elevators.

During the construction of the Electric Elevator, however, *The Roller Mill* took an exceptional interest in the aesthetic appearance and architectural qualities of this particular building. Perhaps due to its unique exterior appearance at the time, the journal called the complex "peculiar" in the same paragraph where the author also stated he was "particularly impressed with the...separation of the storage department from the machinery for weighing and handling the grain- an arrangement which permits the building of separate tanks of various capacities to suit varying conditions."[34] Furthermore, this article points out a vital reason for exposing the bins, far more practical than merely seeking a purity of architectural form. Due to "the storage of all the grain in tanks independent of the main building, there is practically no annoyance from dust."[35] Fittingly for a trade journal, the technical innovations play a greater role in this author's assessment of the Electric Elevator, outweighing the structure's 'peculiar' appearance. Technologically impressed and aesthetically uncertain, this journal's reaction to what it deemed "an important, unique and striking addition to the already immense grain-storage capacity of Buffalo"[36] was echoed by other trade journals, architects and architectural historians in response to the Electric Elevator.

Much of the language used by critics in describing the steel bins of the Electric Elevator emphasizes the exposed, even 'naked' nature of their unusual appearance and innovative function. As Brown reminds us, "A certain amount of mystery had come to surround what exactly went on inside these mysterious and colossal structures."[37] By placing the grain bins outside, free of any exterior surrounding walls, the Electric Elevator presented the first of what Brown labeled "naked tanks." While there were clearly many more strides to go before elevator design would resemble the massive concrete complexes still straddling the waterfront today, the exposed bins of the Electric Elevator marked one of the earliest steps towards twentieth century modernity than most realize. Amongst its many technical innovations, it is the 'nakedness' of the bins that represents the Electric's most substantial contribution to the development of American architectural form in both elevator design and beyond.

As the first elevator in history to ever expose its cylindrical bins, the Electric is, and should have been recognized as, the first of a long line of elevators that express its function in pure form. Yet it was mostly engineering journals, not the renowned European architects, who celebrated this achievement at the time, and for decades afterwards. The invisibility of the Electric Elevator amongst Gropius' *Jahrbuch des Deutschen Werkbundes* and other manifestoes attests to this, particularly when considered in combination with the places where images of the Electric did appear- on the cover of *Roller Mill*, for instance, as well as in several articles in *Engineering News, Engineering Record*, *Northwestern Miller* and *Construction News*. These journals aptly heralded the Electric Elevator as a grand achievement, yet architectural publications were curiously silent on the subject.

The simple omission of exterior walls at the Electric Elevator created a ripple effect of influences, and the impact of these exposed bins cannot be underestimated. Yet, in terms of scholarship, it has been mostly ignored. Banham, one of the only architectural historians to discuss this at any length, pointed out that "even in the U.S., [the Electric Elevator] is rarely mentioned in literature of any sort, yet in introducing electric power, [and] the freestanding cylindrical bin, it effectively introduced the modern elevator."[38] For the most part, however, Winn's omission of walls has generally been omitted, along with the Electric Elevator itself, from the dominant narratives on grain elevator history. This demands a much closer look at the impact these exposed bins have made on not only architectural history, but also on the ways that the general public were able to newly view these structures.

As Mary Woods has demonstrated in *Beyond the Architect's Eye*, "how well spaces, buildings and landscapes photograph or not ultimately affects whether we value or dismiss them."[39] Perhaps, as the architectural profession continues to demonstrate, the Electric Elevator was omitted from many treatises because it simply did not photograph well. Several images of the Electric Elevator survive, as it was frequently photographed at the time of its completion. This was likely due more to the elevator's technical marvels than to an aesthetic attraction to the elevator. Even Banham, who professed the importance of this elevator, echoed the sentiment that its engineering value counteracted its awkward appearance. He wrote, "If not handsome...the [exposed steel bins'] functionality was as strikingly manifest as the technical innovations that underlie the design."[40] Although not doubting the technical importance of the Electric Elevator, Brown took a stronger aesthetic stance than Banham, calling it "worse than 'not handsome.'" Brown criticized the "impersonal" appearance of the "grim looking" marine towers and head house, as well as the "decidedly awkward" layout of the steel bins.[41] Referring to Figure 3, he wrote, "Take for example the photograph Banham reproduced...The meanness of the elevator is emphasized by the sight of the whole structure reflected back in the dark polluted waters of the Buffalo River."[42]

While this description may be a bit of a stretch, the photograph does present the building from an odd angle. Emphasizing the curve in the river bend as well as the atypical juncture between the bins and the main building, the photograph's composition does pinpoint the uniqueness of the Electric Elevator's design in contrast to others.

Banham described this same image with a bit more neutrality, stating “since the exposed side wall of the stiff leg was flush with the end wall of the house, the side elevation presented a curious double gabled silhouette, unlike anything else produced by elevator architecture during this period.”[43] The double gabled silhouette, created at the juncture of the marine leg with the main building, did indeed stand out as a unique feature amongst Buffalo’s many grain elevators. When viewed at a certain angle, as in Figure 3, the odd arrangement of the bins in relation to the double gabled façade could certainly make the Electric Elevator appear to be a clumsy aesthetic design even amidst its technical innovations. In exposing the bins, it seemed, the Electric made a giant step towards modern elevators, but arranging them in this matter only tended to point towards the massive amount of aesthetic and functional progress yet to be made.

This, then, characterized the photographic debut of one of the world’s most innovative grain elevators- a brilliant yet awkward teenager at a debutante ball. This braced-tooth teenager of a grain elevator arrived on the scene ahead of her time, receiving less credit than she deserved due to her unfortunately unphotogenic outward appearance. This “weird, original, and drastically simplified architecture” need not be aesthetically pleasing in order to be historically significant, but it would certainly have helped to secure it a place in future narratives.[44] Particularly at a time when architecture and engineering were becoming increasingly specialized, and separate, professions, the Electric Elevator’s lack of ‘artistic’ outward appearance may have been, as Banham suggested, a contributing factor to its general omission from most of the major architecture texts for subsequent generations.

For the first time, the contents inside a grain elevator were no longer hidden, no longer a mystery. Rather than attempting to protect the bins from the outdoor elements, Winn confidently relied on steel to ensure that the grain would be regulated properly. In doing so, the Electric effectively represented a building without walls, open for all to see. The impact of this architectural legibility was manifold, influencing future engineers, architects and even the general public. Brown succinctly addresses the impressive sight of the Electric's bins at its completion, describing, "the moment of their appearance into the realm of visibility was inevitably spectacular. Remember that, in Buffalo, grain bins had been hidden from sight since the Dart Elevator, and that, in Western civilization, granaries had been hidden from sight [underground or in sanctuaries above] for thousands of years."[45] No longer concealed behind an impenetrable wall as at the Great Northern, the grain bins at the Electric Elevator were, for the first time anywhere, placed out in the open air. These bins were, "not just revealed but exposed to sight...The 'ancient secret' could now be known by anybody who desired to know it...all one had to do was look."[46] This act of *looking* was essential, giving some small sense of agency to the public. But could this 'ancient secret' truly be known merely by looking, or did the lack of exterior walls merely give the appearance of transparency, of legibility? The steel bins were exposed for the world to see, but their function and inner workings were hardly visible to the naked eye. If all one had to do was look at the Electric Elevator to comprehend it, what did they see, and how much did that truly convey?

Constructing Steel Skeletons: X-Ray Visions

Professional journals and popular magazines, along with their readers, increasingly sought to understand the hidden workings of a structure, to expose the inner frame that soared to new heights while providing stability and safety for those inside. Public and professional interest in steel construction methods substantially rose during the 1880s-1920s. The urge to know what lies beneath the surface, to move beyond the monumentality of the façade, became a cultural phenomenon at this time. This may have been catalyzed and encouraged in part by the invention of the X-ray machine by the German physicist Wilhelm Rontgen in 1895. The ability to see through the human body in ways imperceptible to the naked eye called into question many aspects of reality, science, and the occult, challenging the common reliance on the epistemology of vision. X-ray photography soon became a cultural fascination, and “an inquisitive public could gawk at X rays at amusement parks and department stores, where customers stood in line to look through their own hands at the living bone.”[47] This cultural interest in seeing through things, in peering into the layers beneath the surface, also extended to architecture at this time.

Construction methods came into clear focus amidst this interest, and photographs of construction sites began to proliferate the pages of promotional pamphlets, professional journals and popular publications. Photographers were hired specifically to document the construction of a major building at different intervals, anticipating not only the grand-opening of the building itself but also promoting the corporate interests that sponsored its completion. Irving Underhill, for instance, was contracted by F.W. Woolworth to photograph the massive undertaking of the building in his company’s name in New York.[48] Photographs such as those in Figure 4, were then widely distributed to Woolworth store managers and agents throughout the country and abroad, as well as in a promotional volume entitled *Photographic Views of the Construction of the Woolworth Building.* Images like these do far more than document the impressive process of constructing this skyscraper, and they play a large role in garnering interest in the structure and the store itself. As architectural historian Gail Fenske, an expert on the building, has stated, construction photographs inspired a widespread enthusiasm for what David Nye has called the 'technological sublime,' as they "transformed the building's construction into a form of urban theater."[49] Spaced at intervals designed to create suspense, viewers could witness the building rise through the photographs from afar, creating a form of stop-motion flip book of construction as the tower climbed higher and higher.

Beyond their promotional and spectacular value, however, construction photographs also assisted in making these new architectural forms more legible for the general public. Particularly when displayed in a series, construction photographs can provide visual insight into how a building is composed at different stages. For skyscrapers, images typically illustrated the digging of the foundation, the erection of the steel frame, followed by the installation of exterior cladding. Figure 5 provides one such image, produced to record and promote the construction progress at the Guaranty building in Buffalo. Notably, the construction work in this image did not progress purely from the bottom up, but instead appears to have started at the top of the lower third of the building, attesting to the sheer strength of the steel involved in its design. Images such as these sought to make this building type transparent, both in terms of their contents and in terms of their legibility. By viewing construction images of these steel-framed skyscrapers, readers could gain some visual sense, however basic, of how these buildings could possibly soar to such new heights. Furthermore, there is almost a sense of voyeurism, as if seeing a building unfinished provides an illicit sneak peak of a secret about to be revealed. In an article aptly titled "The Riddle of the Tall Building: Has the Skyscraper a Place in American Architecture?" author H.A. Caparn alludes to this, describing the Guaranty building as "a skeleton of steel with its rib spaces filled with crude terra-cotta, a thing economical and unashamed, displaying its inmost secrets for all on the street to see."[50] This 'crude terra cotta,' which is now perhaps the most celebrated feature of the Guaranty Building, was lamented in this statement for its concealing properties, believed to hide the true structural form of the steel that lay beneath the terra cotta ornamentation. Despite this phrase, the Guaranty Building was depicted as a building with nothing to hide, where statements and photographs like these carefully craft an image of the skyscraper as an honest structure that can be readily understood merely by looking at it.

This form of legibility, or at least the illusion of it, also attempted to generate trust in the architect, the engineer, and the construction crew, as well as corporation that funded the entire endeavor. Particularly around 1890-1910, the general populace expressed serious concerns regarding the safety of tall buildings. Rumors abounded, not completely unfounded, that early skyscrapers were known to sway in the wind, settle unevenly, or collapse amidst a natural disaster. After the San Francisco earthquake in 1906, these concerns only became amplified. An article in *The Construction News* stated, "Personally I seriously doubt if a high building ever again will be put up in San

Francisco. The fear of a repetition of the present horror will deter men from investing their money in property in a city that is apt to be shaken to pieces at any moment."[51] Both professional journals and popular magazines attempted to counteract this sense of distrust and fear by publishing articles that explained how steel framing, wind bracing and reinforced concrete functioned. Construction images provided a critical role in this attempt to gain the public's trust in these new structural forms, lending them an instant visual legibility for readers glancing through a magazine. Not only could viewers see inside a building, its beams and braces and floors, but they could also see *through* it. This kind of legibility, or the illusion of it, carefully put the viewer in a position where they believed they could not be fooled. This was during an era of photographic history that still largely embraced its truth claims, where photographs were imbued with indexicality and a perceived visual accuracy that many viewed as objective. In this context, construction images suggested that skyscrapers were structurally trustworthy; they had nothing to hide, and nowhere to hide it. Construction images thus assured the often-wary general public that these skyscrapers could be both spectacles and safe places to live and work.

Construction images of grain elevator sites similarly demonstrate this pursuit of legibility, as photographs served to peer inside what were soon to become opaque walls. Images of these structures under construction proliferated in circulatory publications at the turn of the twentieth century. At grain elevator sites, internal structural methods were increasingly revealed and examined during construction, before exterior walls would cover them forever. Much like skyscraper construction images, grain elevator construction photographs used a temporal form of X-ray vision to convey the skeleton of a structure, seemingly turning a building inside out during its unfinished state. Yet the stakes were much higher for photographers in capturing these construction sites, as grain elevators did not provide public access to the building once it was completed. When the final walls were in place, the interior of these structures would henceforth be seen only by a select few groups, mostly laborers, shippers, and grain magnates. Construction images therefore counteracted the opaque qualities of the exterior of grain elevators, particularly during their earlier manifestations in the nineteenth century. By providing a glimpse inside, and at the construction of the structure itself, construction photographs attempted to illuminate the functions, design and marvels of these seemingly solid structures before their operations would be largely hidden. In this sense, grain elevators were unlike skyscrapers, as their most publically inviting moments occurred before the building was actually finished.

Construction images of the Great Northern elevator provide examples of the quest for structural legibility, particularly due to its inclusion of the brick-weatherproofing wall surrounding the bins. Several trade journals published images of the Great Northern elevator under construction, often directly comparing the appearance of its interior bins with the exterior walls. Unlike at the Electric Elevator, the only way to see the bins at the Great Northern was to photograph them during construction before the exterior walls were erected. Figure 6, published in *The Roller Mill,* provides a glimpse of these bins under construction, at a moment "when the brickwork which is to enclose the tanks was not too far advanced for one to get a good idea of the construction, size, and arrangement of the tanks."[52] Using this brief moment of the building's exposure during construction, this image illustrates the steel bins for the reader's curious eyes. In doing so, the image looks remarkably like a modern grain elevator, with exposed bins lining the waterfront and topped with a steel framed head house. Images like this one demonstrate how fundamentally important this intermediate phase of grain elevator design was to the evolution of the typology- only a brick wall stood between a structure like the Great Northern and one like the Electric Elevator.

Published just two months after the Electric was completed, two images of the Great Northern in *Scientific American* compare the elevator in construction with its completed form. Juxtaposing two engravings, the journal provided a glimpse of the bins before the walls hid them from view, and then illustrated the final view with the walls in place (see Figure 7). The image of the exposed bins emphasizes the curved, rectangular steel plates used to create the cylindrical bins, dwarfing the human workers that were drawn in for scale on wooden scaffolds below. Above, an image depicts the building shortly after its completion, with the brick exterior walls and marine towers in place. The two images, placed in a before-and-after scenario, illustrate the immense differences between the interior and the exterior of the elevator complex. The two images bear little visual resemblance to one another, and without the context of the article a casual reader may not even recognize that they depict the same structure. Comparisons like this one illuminate the very tangible impact that the exterior shell walls had on the outward appearance of the Great Northern, as well as the curiosity its impenetrability inspired in readers who wanted to see what the steel bins looked like inside.

In the context of construction images like these, the exposed steel bins of the Electric Elevator must have looked unfinished to some viewers. The cylindrical tanks more closely resemble the 'before' pictures of the Great Northern in *Scientific American* than they do any other preexisting completed grain elevators. Producing an elevator complex that looked more like a construction image than a completed structure, engineer Winn took a bold leap forward towards modern elevator design, far before any other elevator in Buffalo or beyond. The apparent nakedness of the Electric's bins, therefore, represent a substantial accomplishment in terms of both aesthetic design and innovation, regardless of how strange it may have seemed to viewers at the time.

Construction images also provided the connective tissue for the renowned German architect Erich Mendelsohn's comparison of the grain elevator and the skyscraper in his influential volume *Amerika*. Although the book was published in 1926, Mendelsohn's interest in both grain elevators and skyscrapers was established about ten years prior. Shortly after Gropius published his grain elevator images in the *Jahrbuch Des Deustchen Werkbundes* in 1913, Mendelsohn completed a few sketches of abstracted silos during WWI. His interest in these structures continued for another decade prior to *Amerika*'s publication, evidenced by his inclusion of Buffalo's Washburn-Crosby grain elevator in his 1919 lecture "The Problem of A New Architecture." Presented before the Arbeitsrat fur Kunst, this influential lecture reproduced Gropius' image of the Washburn-Crosby, which Mendelsohn identified as his favorite grain elevator. He described its value in engineering terms, stating, "This group of grain silos in Buffalo masters its spatial components by deploying within its spaces modern construction techniques and technical assemblages of large massings, which seem the result of mathematical pragmatism."[53] His fascination with grain elevators continued in the following years, and the Washburn-Crosby again served as an exemplary specimen in his lecture, "The International Consensus on the New Architectural Concept, or Dynamics and Function" at a conference in Amsterdam in 1923. His interest in this structure, whether he admired it or simply found it irreplaceable as an example of these concepts, demonstrated a considerable awareness of the Washburn-Crosby Elevator long before Mendelsohn published photographs of it in *Amerika*, where he reproduced Gropius' image of the structure alongside new, additional images that he obtained on his journey to Buffalo.

It was not until 1924 that Mendelsohn visited the Washburn-Crosby grain elevator complex in person, and he was in fact the only major European architect to visit Buffalo around this time. While Gropius and Le Corbusier simply marveled at its features through photography, Mendelsohn included Buffalo on his larger tour through America and experienced the site in person. It was at this time that Mendelsohn wrote of his visit to the Washburn Crosby complex to his wife, communicating his characteristically complex notions of the grain elevators with sublime awe, grotesque monstrosity, and a bit of structural misinterpretations, coupled with much-deserved celebration of their form. On October 22, 1924, he wrote of the grain elevator complex:

> Mountainous silos, incredibly space-conscious, but creating space. A random confusion amidst the chaos of loading and unloading corn ships, of railways and bridges, crane monsters with live gestures, hordes of silo cells in concrete, stone, and glazed brick. Then suddenly a silo with administrative buildings, closed horizontal fronts against the stupendous verticals of fifty to a hundred cylinders, and all this in the sharp evening light. I took photographs like mad. Everything else seemed to have been shaped interim to my silo dreams. Everything else was merely a beginning.[54]

Describing the structures through the lens of his own experience, Mendelsohn's letter visualized these grain elevators as if they were in constant motion. They are spaces not of pure form and stillness, but of 'chaos,' places where 'suddenly' silos appear amidst 'crane monsters with live gestures.' In Mendelsohn's account, the grain elevators seem to be continually shifting, moving, transforming, difficult to pin down. Perhaps that is why he 'took photographs like mad,' attempting to freeze this chaotic architecture in time just long enough to bring his 'silo dreams' to fruition.

Seeing the grain elevators in person may have enabled Mendelsohn to understand these structures in a way other European architects could not absorb from afar. While silo bins are more associated with stillness, grain elevators are defined in many ways by movement. With marine legs, towers, and conveyor belts constantly in motion, the functional design of grain elevators is most legible when it is in operation, moving grain from one stage to the next. In this sense, photography is a somewhat ill-suited medium for capturing these structures, conveying only their still forms when in reality they were bustling, noisy structures that were constantly in motion. Grain elevators were an early form of architecture that moved, not unlike Archigram's vision for a Walking City that followed decades later, with marine towers on wheels moving back and forth along rails in order to disperse their mobile legs to scoop up grain from ships. While Mendelsohn's verbal description of Buffalo's grain elevators captured some of this movement, his photographs tended to isolate the stillness of forms fixed in place, much like the images that Gropius reproduced a decade earlier in *Jahrbuch des Deutschen Werkbundes.* Perhaps these visual similarities point to the limitations of photography in this instance, where grain elevators may be better suited for representation through the medium of film.

Able to capture movement in more complex ways than photography, film offered more dynamic ways of understanding this type of architecture in motion. Fritz Lang's *Metropolis* (1927) exemplifies the early potential of film to re-envision cities, depicting futuristic spaces filled with mobile architecture that could not otherwise be fully captured through photography. Although it is unclear if Lang and Mendelsohn continued to travel together to Buffalo, they did share passage on the journey across the Atlantic to America in 1924, when Lang began to film sequences that would later become *Metropolis* in 1927. Architecture served as essential subject matter for that film, coupled with the continuous movement and bright lights of American cities that served as its inspiration on Lang's journey to the country with Mendelsohn, who incidentally reproduced one of Lang's photographs in *Amerika*. Depicting futuristic urban scenes filled with conveyor belts between buildings, *Metropolis* demonstrates the potential for depicting mobile architecture, somewhat reminiscent of the grain elevators with film rather than still photography. Capturing the same sense of architectural motion and industrial, urban chaos full of mechanical forms, Mendelsohn's verbal narrative of the grain elevators accomplishes a visual feat similar to Lang's *Metropolis*, embodying movement through text or film even where photography cannot.

Two years after his visit to Buffalo, Mendelsohn presented the Washburn-Crosby complex in *Amerika* (Figure 8) with a more deliberate sense of awe, coupled this time with a bit more of the European's 'noble savage' approach to American architecture and engineering than his initial letter in 1924. Elements of his initial letter remain clear in the text that accompanies his first few images of the Washburn-Crosby grain elevators in *Amerika*, where he illustrates "unplanned confusion in the chaos of the loading and unloading grain ships," along with "monster cranes with gestures of living creatures" and the "sudden" appearance of an elevator with management and uniform facades.[55] The chaotic, dynamic impression of the elevators that Mendelsohn gained in his visit remains in this description, where the elevators seem to move in ways that could only be informed by his observation at the site, rather than through still photographs.

While Mendelsohn's interpretation of the Washburn-Crosby complex adds a dimension of movement to these otherwise still photographs, his descriptions in *Amerika* also include a condescending tone at times. On the adjacent page, Mendelsohn publishes two more images of grain elevators along with captions. The image labeled 'Grain Elevator 2' incorrectly attributes the structure's location to Chicago, when in fact it is clearly another image of the Washburn-Crosby complex in Buffalo, which was published simply as 'Grain Elevator 1' on the prior page. Furthermore, his reverence for the structure dissipates in this caption, which refers to them as "childhood forms, clumsy, full of primeval power, dedicated to purely practical needs."[56] Here, Mendelsohn's caption incorrectly interprets one of the Washburn Crosby's most important features. The cylindrical marine tower, present in both of Mendelsohn's images for Grain Elevator 1 and 2, provides some of the most potent evidence in grain elevator history that can be used to counteract claims that grain elevators were "dedicated to purely practical needs." This marine tower, which hosts the fixed leg attached to it, was in fact not used to store grain, and thus had virtually no practical incentive to take on a cylindrical form. The shape originates instead from the engineer's intention to continue the cylindrical façade of silos that preexisted the tower. Often this form of addition resulted in the rectangular box forms seen on other marine leg towers, much like the others adjacent to this one on the Washburn Crosby complex or those at the Great Northern. Instead, the engineer erected a cylindrical one for aesthetic reasons, rather than structural ones. Taking this into account, Mendelsohn's description of this 'clumsy' form as 'dedicated to purely practical needs' reveals his misinterpretation of the structure. Furthermore, the fact that even a trained, renowned architect could misinterpret the function of this form indicates that grain elevator designs were not as legible as many architects claimed. This suggests they were not as visually legible as many European architects claimed, but rather gave only the exterior appearance of structural transparency instead.

Mendelsohn included at least two photographs of the Washburn Crosby elevator complex in *Amerika*, along with two other Buffalo elevators that he likely visited while in Buffalo- the American and the Kellogg. Yet these grain elevators form only one half of the section he titled "The Gigantic," and they can be best understood in the context of the entire chapter. Overall, the section includes sixteen images and captions, the first eight of which are devoted to skyscrapers and the remaining eight portray grain elevators. Although he never directly compares these two building types in verbal form, the layout and captions of these images, along with the composition of the photographs themselves, provide insight into Mendelsohn's careful juxtaposition of the skyscraper and the grain elevator. Equally distributed throughout the chapter, Mendelsohn identified both the skyscraper and the grain elevator as two distinctively American building types, characterized by their 'gigantic' qualities as much as by their contributions to national design.

While he gives both building types the same amount of real estate in this chapter, Mendelsohn clearly celebrated and lamented the skyscraper and the grain elevator for different, interlocking reasons. His photographs and layout reveal Mendelsohn's admiration for both kinds of structures in their simplest form, yet the text clearly laments instances of both types where he perceived their failure to promote unadorned structural truths. Overall, skyscrapers appear more frequently in *Amerika*, as Mendelsohn included over thirty images of them scattered throughout several different sections of the publication. Grain elevators appear, however, almost solely in ‘The Gigantic,’ except for a single image of a Chicago grain elevator that was included in the section labeled ‘Typically American Traits.’ While Mendelsohn incorporated skyscrapers in a variety of contexts, his inclusion of grain elevators was much less flexible. Their rigid placement seems to echo Corbusier’s use of grain elevator images, which functioned primarily as irreplaceable examples rather than sources of admiration.

Skyscrapers, too, served as examples in Mendelsohn’s *Amerika*, although not always in a favorable light. Photographing skyscrapers from ground level looking up, Mendelsohn’s compositional techniques often incorporated angles that emphasized the dizzying height of these buildings. Images such as Figure 9 of the Shelton Hotel (O’Keeffe’s residence) stress the sheer vertical qualities of the skyscraper from pedestrian level, embodying what Mendelsohn has described as an American tendency to “cause a giddiness of perspective.”[57] Conversely, Mendelsohn applies this photographic angle to grain elevators only once, in Figure 10. In all the other images of grain elevators, Mendelsohn circumambulates the structures, photographing them from a respectable distance, and rarely compositionally centered. In Figure 10, however, Mendelsohn views the pedestrian causeways between silos from the ground looking sharply up. This photographic composition mimics the images of fire escapes that Mendelsohn produces later in the volume. Despite his consistent, clear comparison of grain elevators and skyscrapers throughout ‘The Gigantic,’ he photographically emphasizes their shared vertical qualities only once, through this image that peers upward much like his skyscraper images.

While height plays a large role in depicting the gigantic forms of both building types, Mendelsohn's captions suggest that he compared the skyscraper and grain elevator with different aims in mind. He used the grain elevators as examples not only of height, but also of what he viewed as a valuable purity of form, unadorned by exterior ornamentation. Admiring some skyscrapers over others, Mendelsohn clearly delineates his preferences for what he observes as a "the start of a cleaner style free of unobjective ornament" at the Equitable Trust Building over instances where "the gigantic...becomes petty and earthbound when bourgeois needs wreck the proportions with niggling details of columns."[58] Images such as Figure 11 not only emphasize the height of the Woolworth Building, but also provide a detailed look at its ornamentation, which Mendelsohn clearly laments as a backwards move amidst otherwise impressive American building methods. Where he regrets the American approach to "cladding [the skyscraper] in Renaissance splendor," even though it was decidedly more Neogothic in ornamentation, he celebrates the grain elevators for their polar opposite approach to exterior ornamentation. Stating that 'Grain Elevator 5' is "reduced to perfect clarity," Mendelsohn commends its "visible expression of an intent to organize."[59] In grain elevators, and not in skyscrapers, Mendelsohn saw the most fitting examples of what he believed architecture should aim for, wherein "a bare practical form becomes abstract beauty."[60] Even if he did view their design as occasionally 'chaotic' or 'clumsy childhood forms,' the unadorned exteriors of grain elevators, Mendelsohn believed, lent them a grace that skyscrapers had yet to achieve.

Mendelsohn's comparison of grain elevators and skyscrapers in 'The Gigantic' reveal his interest in promoting an unadorned, clear expression of function within an exterior form. Rather than emphasizing their similar qualities such as height or construction method, Mendelsohn instead included images and captions that tended to illuminate their different exterior treatments. The composition, angle and cropping of his images emphasize these qualities in both building types, revealing a photographic search for architectural clarity and unadorned form. His comparative aims came to fruition towards the end of *Amerika*, where he produced several images of skyscraper construction sites in a section labeled 'The New-The Coming.' Depicting steel framed skyscrapers under construction in Detroit and Chicago, these photographs were taken from ground level looking up in a manner similar to the other skyscraper images (Figure 12). Mendelsohn's accompanying captions demonstrate his interest in these sites primarily for their formal qualities, unclouded by the exterior ornamentation that was to come. He wrote, "The bare bones of the construction force the truth upon us. When it can still be seen without cladding, the skeleton shows, more clearly and splendidly than the finished building, the boldness of construction with iron or reinforced concrete."[61] This skeleton, it seemed, was the apex of Mendelsohn's vision for a new architecture, realized in the steel construction sites of American skyscrapers. Although he seems to prefer the skyscraper in this state, he acknowledged that "Of course, it remains merely a skeleton and still awaits an equivalent expressiveness of form."[62] Here the American skyscraper is a work in progress, one that Mendelsohn likely believed would be more powerful if it took a few visual cues from the 'pure forms' of the grain elevators.

Through his photographic compositions, his captions, and his organizational layout, Mendelsohn searches for the fundamental truth within these new American architectural forms in hopes of bringing them to the exterior. In what he views as an "X-ray of the finished building," he finds a glimpse of this potential in the steel skeleton of an American construction site. Identifying the grain elevators as a clear expression of form, he celebrated this steel skeleton skyscraper in ways that echo the earlier 'naked' qualities of the steel bins at the Electric Elevator. His comparison even goes as far as to distinguish the internal and external portions of this architectural 'body,' stating "All the internal organs- water pipes, sewer pipes, lighting air conduits, and conveyances- are attached to the iron framework long before the finishing commences."[63] These construction photographs solidify Mendelsohn's aims to illustrate what he believes should be the goals of American architecture. His comparison of skyscrapers and grain elevators teased out some ideal combination of the two building types, wherein Mendelsohn seemed to envision the dizzying height of the steel skeleton skyscraper clothed in the pure geometric forms of the grain elevator. It is in these construction sites that he found a glimpse of this combination, even if it is only fleeting and unfinished. In these 'x-rays of the finished buildings,' Mendelsohn identified the uniting aim of the skyscraper and the grain elevator, one that only begins to satisfy his quest for architectural legibility.

Part Two: Separate Professions, Mutual Concerns

Despite their inherent differences, the skyscraper and the grain elevator were often identified for one shared quality in particular: height. Both typically tower above the rest of the buildings in the area, with ten, twenty and eventually thirty, fifty and even seventy-story tall buildings marking the American skyline as one of pinpoints on an erratic graph, erratic heartbeats on a cardiac monitor. Their reasons for height are different, one driven primarily by physical properties of grain and the other driven largely by real estate pressures and competition, yet both building types are easily associated with their massive towering qualities. They serve as iconic landmarks, as their height enables city dwellers on the ground to orient themselves in relation to these tall buildings. Brown has noticed a similar function for grain elevators, where "they are always among the very tallest buildings in the area...and so, in addition to their primary functions, grain elevators inevitably find themselves tasked with...being visual landmarks."[64] Height has marked these two building types as one of its primary features, making them universally accessible even to the most distant viewer.

Conversely, there is a certain power embedded in viewing these buildings from the top, much like a villain in a James Bond film. Views from the tops of skyscrapers such as the Empire State Building often serve not only to orient, but also to entertain and educate viewers by placing them briefly at the top of the city on both a physical and sociocultural level. Grain elevators, however, are much more restricted sites, and have not traditionally been open to the general public for views from the top. Like skyscrapers, they too serve as "privileged vantage points from which one can see the entire surrounding region," but only a very select few get to enjoy that view.[65] Brown reflects on this disjuncture between seeing a grain elevator from the bottom and from the top, stating "There's always an asymmetry in the grain elevator's 'unofficial' functions: while everyone can see the grain elevator, only a few people get to see the view *from* the grain elevator."[66] Those few people differed widely in socioeconomic status, ranging from the owner of the structure to the laborers who daily worked inside, especially those at the top of the head house. Architects and engineers also would have likely seen the views from the top during and after construction, although certainly not on a long term and regular basis like the workers. This view was far more privileged than the publicly accessible skyscraper viewing points, and there is a certain grandiose beauty coupled with a small justice in knowing that it was the workers who got to enjoy it far more than anyone else.

Construction images produced by photographers such as Lewis Hine, Margaret-Bourke White, and Milton Rogovin begin to provide insight into the labor that is usually behind the scenes, providing a different form of x-ray vision into these steel skeletons. Scholars such as Vicki Goldberg, Michael Frisch and C. Zoe Smith, amongst others, have addressed the impact of these images, and their production conditions, at length, providing valuable insight into this often ignored aspect of architectural history.[67] This section will look a bit closer at the emergence of a new profession during these periods of intense construction. Rather than solely examining the steel skeleton itself, this discussion will address the relationship between these construction methods and the other players working behind the scenes who helped develop them on site. General contractors, along with steel manufacturers, made a significant, yet often overlooked, role in the transformation of the architectural profession as these new building types emerged.

In an era when the architect and engineer were becoming increasingly specialized figures, steel manufacturers provided valuable guidance for architects on how to incorporate these materials into their designs. Constantly improving the strength, flexibility and thinness of steel, manufacturers contributed to the knowledge base for new designs in subtle but substantial ways. Even before steel became a dominant construction material, architects and engineers in the mid to late nineteenth century, "relied on early ironwork manufacturers to provide them with drawings and specifications."[68] Providing insight on how to use these materials, manufacturers would consult with architects and engineers on the capacity of their materials, whether it be iron, terra cotta, or steel, in order to ensure that buildings would be structurally sound. Although the advice they provided was not always sufficient, it is important to note that this relationship between manufacturers and architects was bidirectional.[69] Recognizing the architect's need for designing tall office buildings with minimal footprints, steel manufacturers began to improve both their materials and marketing techniques in the last decades of the nineteenth century. Louis Sullivan himself identified the influence and inspiration that flowed between these two professions, suggesting that manufacturers began to develop better forms of steel in direct response to the architectural search for new ways to erect taller office buildings. In *Autobiography of an Idea*, he wrote, "the Chicago activity in erecting high buildings finally attracted the attention of the local sales managers of Eastern Rolling mills...which for some time past had been rolling those structural shapes that had long been in use in bridge work."[70] When manufacturers realized that architects needed improved forms of steel, they responded to this need with a combination of material innovation and marketing tactics.

While this occurred with the manufacturers of several different building materials, steel companies provided the most obvious example of this sales pattern. Particularly since steel manufacturers tended to be some of the largest corporations in America at the time, their impact on building technology and architectural design should not be overlooked. After the Civil War and Reconstruction period, steel manufacturers like Andrew Carnegie "sought new markets for steel in the wake of railroad overexpansion during the late nineteenth century."[71] Shifting their attention to architectural firms and the building trades, steel manufacturers not only improved their materials for construction purposes, but also found new ways to improve product sales. Motivated largely by the desire for profit, manufacturers functioned as salesmen who identified a market in need and then subsequently convinced buyers- mostly architects, engineers, and general contractors- to incorporate their product in new designs. Often reaching out directly to firms, manufacturers "also supplied architects with handbooks to figure the size of different building members."[72] Operating in capacities that simultaneously provided practical advice and sales pitches, larger manufacturers, "as part of their marketing, offered...within their catalogues, design tables for [steel] columns and beams."[73] Sullivan acknowledged the impact that manufacturers had on the profession of architecture, identifying the close relationship between improved building materials and marketing strategies. He observed, "The passion to *sell* is the impelling power in American life. Manufacturing is subsidiary and adventitious...It was a matter of vision in salesmanship based upon engineering imagination and technique. Thus the idea of a steel frame which should carry all the load was tentatively presented to architects by manufacturers."[74] Steel manufacturers therefore played an integral, though often invisible role, in encouraging architects to use steel in their designs as skyscrapers towered higher and higher at the turn of the twentieth century.

Companies such as U.S. Steel, Bethlehem Steel and Buffalo's own Lackawanna Steel (which merged with Bethlehem Steel in 1922) supplied the majority of the steel for construction projects in the nation for much of the late nineteenth and early twentieth century. In Buffalo, steel manufacturing was an integral part of the local economy for nearly a century, greatly impacting thousands of laborers, entrepreneurs, contractors and nearby residents that lived and worked in conjunction with the Lackawanna Steel plant.[75] Established at a sprawling industrial site located just south of Buffalo in 1902, the company was founded on land purchased by John J Albright (who was also President of the Pan American Exposition at the time) in the town of Lackawanna. After relocating the company from Scranton, Pennsylvania, the Lackawanna Steel company soon rivaled other large steel manufacturers. In its first few years of operation, Lackawanna Steel was the largest independent steel company in the nation, and was only stripped of this title by U.S. Steel due to a series of corporate mergers. Purchased by Bethlehem Steel in 1922, the site formerly known as Lackawanna Steel continued to produce steel for the building trades into the mid-twentieth century. During World War II, for instance, the company employed 20,000 workers and was the world's largest steel factory. The steel plant produced a variety of products over its lengthy history, ranging from beams, columns and supports used for construction to making components for nuclear weapons during wartime. Buildings and bridges across North America were constructed with

Lackawanna Steel products, indicating the national reputation of this large manufacturer whose products were distributed in multiple forms. Given the substantial economic impact that steel production had on the city of Buffalo for nearly a century, it is certainly reasonable to suggest that the presence of Lackawanna Steel was in some way tied to the simultaneous emergence of some of the first steel skyscrapers and steel grain elevators in Buffalo. Likely sourced from Lackawanna Steel just a few miles away, the nationwide impact of steel manufacturers on the fields of architecture and engineering can thus be seen on an extremely local scale within the Buffalo metropolitan region.

The General Contractor

New construction methods and materials created the demand for a new professional specialization, one that could organize both skilled and unskilled laborers and manage the construction site on a daily basis. Often the architect or engineer is credited with these tasks, but construction images point to another role in this massive process- the actual act of construction. Emerging as early as the Antebellum period, general contractors began coordinating building projects before the modern grain elevator and skyscraper demanded their skills on a large scale. As Woods notes, "After 1850, large general contracting firms, a new breed of builders, emerged to manage institutional and commercial commissions."[76] Working primarily on institutional or commercial buildings, which required more coordination than a modest residence for instance, general contractors established their value as labor supervisors and construction managers.

By the 1880s, three of the largest general contractor firms, run by the Norcross Brothers, George Fuller, and Marc Eidlitz, had already been established. Eidlitz and Company began receiving contracts as early as 1854, the Norcross Brothers began their work by constructing sites for Richardson in 1869, and George Fuller established his business in 1882. During the decades prior to skyscraper commissions, the Norcross Brothers were perhaps the most successful. Constructing several notable buildings designed by Richardson, as well as the 'Palace of Light' at Niagara Falls, the Norcross Brothers also had the distinct advantage of acquiring their construction materials from their own brick kilns and lumber yards. With holdings in timber, stone and brick scattered across the nation from Maine to Georgia, the Norcross Brothers functioned as both general contractors and materials suppliers, exemplifying the potential of this new field to expand in the coming decades.

When new building types and materials emerged in the late nineteenth century, these skills became even more important during the construction of large buildings. The increasingly complex designs required to erect skyscrapers and grain elevators accelerated the impact of the general contractor during this time, responding to the demand for leadership and technical problem solving on site during the construction period. Engaged primarily in the daily tasks related to construction, general contractors managed and coordinated laborers, solved unanticipated construction problems, and communicated information about the project, its timeline, and status to the architects and engineers. Laborer management was an integral part of the general contractor's function, as they often dealt with and managed as many as thirty separate building trades during the construction of a single skyscraper.[77]

By the late nineteenth century, the role of the general contractor had become controversial amongst architects and engineers. Adler notably criticized the general contractor, portraying the figure as someone who threatened to eliminate the architect's responsibility to supervise the construction of buildings that he designed. In the June 1899 issue of *The Inland Architect*, Adler advised architects to better acquaint themselves with the details of the construction process, in order to both save the client money as well as take more responsibility over the completion of their own building.[78] Other criticisms revealed that engineers, more so than architects, were threatened by the general contractor, and worried they would potentially replace engineering duties during construction. In a 1904 edition of *Engineering Record,* engineer R.P Bolton wrote that too many architects were becoming content to obtain "information, guidance, proportions, even plans and specifications, from contractors and prospective bidders."[79] Bolton suggested that architects' increasing dependence on contractors, an issue Adler also identified, should be "rectified through the use of the specialized services of the engineer."[80] While some engineers were initially threatened by the general contractor's new role as construction manager, their "specialized services" distinguished both fields as having unique skills to contribute to the increasing monumental task of erecting a steel building.

While architects and engineers often formed firms that specialized primarily in a few related building types, general contractors erected a broad diversity of buildings, ranging from commercial and institutional to religious and industrial. Due to the nature of construction and its daily operations, general contractor skills were more readily applied to a broader scope of building types than those of an architect or engineer. It was more common, of course, for a contractor or contractor company to specialize in one particular building type or building material, marketing themselves as experts in a singular type. Some companies focused their efforts primarily on skyscraper projects, while others engaged primarily in the industrial construction of bridges or factories. Others, however, embraced a more diverse approach and provided services for a variety of commercial and industrial endeavors.

The James Stewart & Company serves as one example of this diversity of projects, and this family-run firm of general contractors led construction crews in three countries over several decades. Initially founded in Canada in 1845 by Scotland-born James Stewart (1822-1902), the company moved to St. Louis in 1865. Both of his sons, A.M. Stewart and James C. Stewart Jr., became partners in the firm in 1880s, with the latter eventually becoming president of Stewart & Company after his father's retirement in 1892. By this time, the company had engaged in dozens of projects across the country, establishing offices in Pittsburgh, St. Louis and New Orleans. The company continued to expand their operations, establishing an office in Chicago inside the steel skyscraper Fisher Building built by D.H. Burnham & Company in order to work in close proximity to their many projects in the vicinity. Stewart & Company also established an office in Buffalo, and an advertisement from 1897, the same year the Electric and the Great Northern were completed, lists their address inside the newly finished Guaranty building. Notably, the advertisement was placed alongside an advertisement for the SSECC, the company that built the Electric Elevator, whose offices were also located inside the Guaranty Building. This prominent address not only suggests the financial success and favorable reputation of these firms at the time, but also indicates their intimate awareness with the pioneering steel frame construction built into the very fabric of their own offices.

Stewart & Company's accomplishments over their lengthy career attest to the true diversity of their projects. Some of their well-known accomplishments include Madison Square Garden (1925-1968) and the American Museum of Natural History in Manhattan, as well as the Department of Labor building and State Capitol buildings of Utah, Oklahoma and Ohio in Washington D.C. The firm also built several skyscrapers, specializing in steel skeleton construction methods. Projects included the fourteen-story National Bank of Commerce in St. Louis (1908) and the thirty-four-story New York Central Building at 230 Park Avenue in New York (1929). Stewart & Company also achieved international acclaim when they constructed the Savoy Hotel in London, which was among the first steel skeleton framed building erected in that city. Awarded the contract because of their successful erection of the Midland Railway Company's hotel in nearby Manchester, Stewart & Company completed the building in just one year. Trade journals on both sides of the Atlantic marveled at the firm's rapid construction progress, stating "It is a matter of history how Stewart & Company got the bricklayers to laying from 1800 to 2500 bricks a day instead of 450 to 600...they succeeded in doing in eleven months what they had promised in 18, and what the English contractors had declared could not be completed under five years."[81] The firm became known for their speed and efficiency henceforth, attracting many other clients.

Although their list of projects attests to the firm's ability to construct notable institutional or commercial buildings, Stewart & Company also excelled at erecting industrial structures as well. The functions of their many industrial structures widely differed, yet Stewart & Company managed to oversee a broad diversity of designs. Industrial projects included Westinghouse plants, distilling and brewing facilities, sugar refineries and warehouses. Notable industrial buildings include the "castlelike group of buildings" at the Anhauser Busch Brewing Association in St. Louis, which included a barley cleaning house and grain storage department, indicating the firm's awareness of the specific behaviors of grain in bulk long before they began erecting grain elevators. The firm also erected the Armstrong Cork Company manufacturing plant in Lancaster, Pennsylvania, which Charles Demuth featured in several of his paintings. Incidentally, Stewart & Company also built the plant for Armstrong Cork Company at Beaver Falls in 1906, which produced the Beaver Board materials that Demuth used as a canvas on which to paint the Lancaster plant.[82] The firm also engaged in substantial waterfront construction such as wharves, docks and water terminals. Stewart & Company rebuilt the Galveston, Texas waterfront after it was destroyed by severe storms in 1899 and then applied similar techniques in Toronto, where they dredged and filled 1000 acres of industrial ground adjoining the harbor and constructed 12 miles of concrete sealed walls and docks.

Closer to Buffalo, the firm constructed the Niagara Falls Power Company office building, power house and stone arched bridge in 1895. Designed by McKim, Mead and White, the office building and power house were built of a steel framework clad in a stone exterior, and were celebrated by many for its blend of classical architectural design with innovative engineering, merging industrial sensibilities with institutional design. Buildings like this one represent the versatility of the firm, which was able to construct a building that was simultaneously industrial and institutional in design.

Grain elevators were one of Stewart & Company's specialties, and they constructed approximately fifty during the firm's career. As one of the firm's promotional booklets confidently states, "the firm is at the head of the profession in the erection of grain handling equipments and buildings for the storage of grain."[83] Their record demonstrates a prolific career in grain elevator construction. In addition to the grain elevators they built in American Midwestern cities and the Canadian grain belt, Stewart & Company also constructed a few in New Orleans. In 1887, the firm built what has been credited as the first major grain elevator in the south, utilizing the city's Southport Wharf to ship American grain to Europe through the Gulf of Mexico.

Stewart & Company also constructed several grain elevators in Buffalo, particularly in the early 1900s. They built at least seven of Buffalo's elevators, including the Perot, the American Malting Company, the Eastern Elevator Company, the Superior Elevator and elevators B and C of the Washburn Crosby complex.[84] Several of these elevators represented significant advancements in grain elevator construction. The American Malting Company elevator, for instance, was built of reinforced concrete as early as 1906, and represents the first use of that material in Buffalo elevator design. Stewart & Company built the elevator using the slip-form method of construction, wherein cylindrical molds, or slip forms, were filled with concrete to create the grain bins. Typically this process would take several days, as workers would wait for the concrete to set before raising the slip form to the next level. At the American Malting Company Elevator, however, Stewart & Company poured the concrete as they continued to raise the slip forms without stopping, making it the first example of continuously poured slip form construction in the nation.

Figure 13 illustrates the slip-form process of concrete construction at the Superior Elevator in Buffalo, erected by James Stewart & Company in 1925. Depicted during the early stages of slip form construction, the photograph shows the circular molding used to shape and contain the concrete. At each stage, concrete would be poured into the slip-form mold, and then the mold would be raised to the next level and poured again. Rather than stopping for significant periods of time to let the concrete dry and set, Stewart & Company's method of continuous slip form construction meant that the mold would be raised much faster. Part of this innovation can be attributed to the challenges created by Buffalo's notoriously wintry weather. Speed and efficiency became a primary concern for contractors attempting to complete the construction of grain elevators there before cold and stormy weather set in, particularly in such close proximity to the lake, and this challenge played a significant role in demanding innovation and new solutions to this demanding task and time constraint. Figure 14 demonstrates the speed of this construction method, depicting the same grain elevator just one month later. Dated at the bottom right of the photograph, the first image was captured on April 23, 1925, and the bins appear nearly complete by May 21, 1925 in the second image. By 1925, grain elevators like the Superior were constructed using the process depicted in these photographs.

Due to the firm's lengthy and prolific experience in grain elevator construction, they tended to favor some building materials over others. Devoting several pages to "the progress of grain elevators," the booklet describes construction methods and explains the firm's preferences for steel and concrete over brick or tile. Many of the firm's concrete elevators were built using concrete that was mixed on site, typically by Stewart &

Company workers themselves. Aggregate for many of Buffalo's large grain elevators was usually supplied directly from the Seneca Shoals of Lake Erie, , and the quality of the dredged material was closely controlled and detailed in the building specifications as well as by contractors supervising the construction site.[85] Typically clean, round gravel and well-graded sand arrived at the dock, where analyses were made to ensure proper quality and then were mixed with other material sources to achieve the desired proportioning. Bagged cement, often sourced from the Portland Cement Company, was then combined with this local gravel and sand, and was proportioned by hand and then mixed by machine on site in preparation for the slip form construction.[86] These material specifications appear to have been developed in part by Stewart & Company and in part by larger manufacturers such as the Portland Cement Company. Pointing to their development of this method, the firm also states that "less skilled labor is required in concrete construction than in either steel, brick or tile...making it decidedly the cheapest."[87] While less skilled labor may be required, Stewart & Company reminds the reader, likely a potential client, that skilled construction management is essential in erecting grain elevators. "In building grain elevators, accurate scientific knowledge, resourcefulness in meeting unusual conditions, and general business integrity play an important part."[88] When describing the role of the general contractor in this manner, the firm points to the difficulty of particular building materials as the catalyst for developing specialized skills:

> The materials out of which elevators are now built, such as steel and concrete, are not only costly, but their successful use requires scientific designing and a high degree of skill in their employment. Elevator designing and building is now a highly developed specialty, and a class of work that should only be entrusted to responsible specialists.[89]

Much like the steel skeleton skyscrapers they erected in New York, Buffalo's grain elevators, both steel and concrete, demanded specialized skills in order to construct them in a safe and timely manner. In the case of Stewart & Company, however, this form of specialization was easily transferrable to the construction of several seemingly different building types, ranging from grain elevators to skyscrapers.

The firm's ability to erect structures with vastly different designs certainly blurs the lines between these two building typologies. As their publications indicated, construction was a specialized skill in itself, much like an architect's ability to envision 'pure forms' or an engineer's ability to develop a new wind-bracing system. Despite the diverse plans that architects and engineers produced, general contractors could construct a building using the umbrella of methods and management techniques that characterized the core of their profession. Stewart & Company's work on both skyscrapers and grain elevators also attests to the shared mechanics of these two seemingly disparate building types.

General contractors may have been more familiar with the similarities of their construction methods and building materials than architects or engineers, who typically limited their work to only one or another of these types. Although general contractors did not play a direct role in designing these buildings, they did serve as a direct link between the skyscraper and the grain elevator. Due to their involvement in erecting both types of buildings, general contractors would have been the most likely to recognize the similar challenges and solutions that skyscrapers and grain elevators faced at the end of the nineteenth century. This dual experience may have provided valuable insight to architects and engineers like Adler, who would perhaps not have 'strayed away' from their shared solutions, had these perspectives not been more readily shared. As the emergence of the general contractor demonstrates, new building types and technologies required the simultaneous separation and collaboration of different professionals with increasingly specialized skills.

Despite this demonstrated need for collaboration, the parallel histories of the grain elevator and the skyscraper reveal some missed opportunities for these professions to learn from each other. The disparate placement of skyscrapers and grain elevators in separate journals reflects these building types operating in different domains of architecture and engineering, each with publications that tended to circulate primarily to one profession or the other. While many journals, scholars and professional figures encouraged collaboration, evidence points to some missed opportunities for advancing the progress in building technologies for mutual benefit. As engineers struggled to build steel grain elevators contemporaneously with the architectural development of steel skeleton framed skyscrapers, they faced similar challenges yet arrived at different solutions. General contractors likely played a fundamental role in connecting these two fields, employing technical solutions in situations where the juncture of architecture and engineering left a gap. By taking a closer look at the use of pile foundation methods, we can see that grain elevator designers employed the solution far earlier than skyscraper architects, who were perhaps slow to see the solution due to their seemingly different fields.

Shared Solutions

The similar material evolution between the steel bin grain elevator and the steel skyscraper reflected a broader context of changing technology and construction methods at the time. Each typology adapted new materials as they became available and tested, and steel framing emerged in response to a similar set of challenges faced by both of these typologies. Both the skyscraper and the grain elevator prioritized height, leading to problems specific to tall buildings. Their reasons for needing height differed; as the skyscraper sought to make the most efficient use of a small urban lot due to real estate pressures, the grain elevator required height to offset the lateral force of grain, as well as to store the maximum amount for profit. As buildings towered higher and higher, they became more susceptible to wind, requiring new materials and methods to stabilize these structures from strong gales. Steel, more so than masonry or iron, was flexible enough for a skyscraper to withstand wind, particularly as new forms of bracing were developed. Wind and weatherproofing was also a concern for grain elevator designers, evidenced by the Great Northern's massive brick wall as well as the damage that its tall marine towers suffered during a storm in 1922. Fireproofing, windproofing and strong foundations were constant engineering concerns as the designs for these two typologies advanced, and steel addressed these challenges better than masonry or wood. Engineers eventually developed different solutions to the same problems based on the vastly different functions of these two building types, but the era of steel at the end of the nineteenth century reveals some of their earliest responses to these shared challenges.

Poor foundational ground proved to be one of the biggest challenges faced by architects and engineers during the construction of a skyscraper or a grain elevator. For early skyscraper designers in Chicago, the city's loamy ground was filled with swampy soil and rocky patches, particularly in areas of the Loop that were close to Lake Michigan. Inconsistent, damp soil provided a challenge to designers in Chicago, as well as Buffalo and many areas of the Great Lakes region, unlike New York City where, as one journal suggested, "Manhattan Island is almost a solid rock; the conditions are most favorable for foundations."[90] While New York was an exception, designers in Chicago, Buffalo and the Great Lakes faced a substantial challenge in constructing tall buildings on inconsistent, damp, soft ground. Grain elevator designers faced the same problem, particularly since these structures were typically built directly on the waterfront. Although their functions were vastly different, grain elevators and skyscrapers faced the same challenges in building on damp ground.

In this particular challenge, the grain elevator presented a solution before the skyscraper. Overall, pile foundations have a long history that dates back to antiquity, when Greek and Roman builders used timber pile foundations to build bridges or waterfront sheds.[91] Centuries later, as technology and the availability of better building materials improved, engineers began using more durable materials to construct and drive their piles further into the ground. Joseph Dart's first grain elevator, built by engineer Robert Dunbar, used a wooden pile foundation to support its building load, where closely spaced log piles were driven deep into the soft soil near the mouth of the Buffalo harbor. By the 1860s, before the first skyscrapers were built, many grain elevators were being built with pile foundations, often of timber but also of stone.[92] By 1870, every elevator in Buffalo used stone or timber pile foundations in its construction.[93] While the length and material of the piles would vary depending on the character of the soil and its proximity to water, pile foundations provided grain elevators with stability, effectively providing firm ground where there was none. By the turn of the century, concrete pile foundations were quite common for grain elevator construction, and these could withstand much heavier loads.

By 1897, when the Electric and Great Northern were nearing completion, most grain elevators used pile foundations but only a few skyscrapers had employed stone or concrete pile foundations during construction, including the Guaranty Building. A few decades earlier in 1873, notable Chicago architect Edward Baumann, an early mentor to Dankmar Adler, published his conclusions and advice on employing pile foundations for skyscrapers in a thirty-eight-page pamphlet titled "Methods of Isolated Piers."[94] Baumann laid no claim to inventing the pile foundation method, but rather promoted it as an applicable solution to the problem of skyscraper design on Chicago's loamy soil. Although the publication eventually influenced architects far beyond Chicago, it took a few decades for the practice to be employed consistently to skyscrapers and with reliable results. By 1897, Edward Shankland, the chief engineer for Burnham and Root who had just completed work on the Ellicott Square Building, remarked in 1897, "Pile foundations have been very little used under office buildings, although almost invariably under the warehouses and other buildings on the banks of the river."[95]

Although they faced the same challenging conditions, designers of grain elevators and skyscrapers were remarkably slow to see that the pile foundations provided a solution for both building types. Like Shankland, Adler similarly recognized the potential for adapting the pile foundation method from grain elevators into skyscraper design. He stated his preference for the method as early as 1891, noting "their long record of success in riverfront warehouses and grain elevators" as an important precedent to what he believed should be adapted to tall office building construction. In the article "Comment on Skyscrapers" he published in *The Economist*, Adler identified some of the specific challenges that loamy ground created for both skyscrapers and grain elevators. Directly comparing the two building types in relation to foundation methods, he wrote,

> Of all the buildings erected in this city [Chicago] there is not one of the foundations of which are subjected to severer strains that the grain elevators. Today there may be piled in every bin fifty, seventy five or one hundred feet high of grain; tomorrow this load may be entirely discharged from one or more bins, while others retain their full load...In other words, the method adopted for the construction of elevator foundations does not show that sensitiveness to increase or diminution of load that is exhibited by the foundations of our business buildings: and yet the loads per square foot of soil under the building are as great as in the highest of our business buildings, and the soil, in most instances, is the most treacherous to be found in Chicago.[96]

Both kinds of buildings, Adler asserted, need to be able to withstand shifting load weights, sudden changes and vibrations resulting from interior movement. In his view, grain elevators and skyscrapers faced such similar challenges that it made sense they should employ similar technical solutions. Noting the long record of success in using pile foundations for grain elevator construction, Adler pondered this missed opportunity for skyscraper construction, stating, "It may be asked why, when so striking an example of absolute reliability of foundation construction has been before us for so many years, we have strayed away from this."[97]

Adler identifies himself as partly responsible for this 'straying away' from grain elevator foundation construction, and his professional history provides insight into this process. It is essential to note that Adler was trained as an engineer, not an architect, at a time when the two fields were becoming increasingly specialized. Adler established a substantial career that predated Sullivan's work. Even though the latter often receives the credit for their shared commissions, it is essential to note that it was in fact Adler who first hired Sullivan, rather than the other way around. The partnership of Adler and Sullivan provides an excellent example of the nuanced collaboration, specialization and often invisible forces that function behind the celebrated scenes of a remarkable firm. While "Sullivan's career exemplifies the myth of the architect as solitary genius," Adler was often the unsung hero providing essential support that is often overlooked by historians.[98] In the partnership, historians Gilbert Herbert and Mark Donchin argue, "it was Adler the engineer who designed the structure and environmental-control systems, who saw the process through from preliminary design to final construction...and was ultimately responsible for the integration of all aspects of the design into one unified work of architecture."[99] Utilizing his substantial training as an engineer, Adler performed many of the tasks that are often overshadowed by Sullivan's more aesthetically-oriented design contributions.

After serving in the Union Army as an engineer during the Civil War, Adler worked as an apprentice in a few Chicago firms and then began working at Edward Burling's firm in 1871. By the time Adler met him, Burling had established a long and diverse career in Chicago. Prior to the Civil War, Burling designed a number of grain elevators, including one for the Newberry and Dole Company that was allegedly the first grain elevator in Chicago.[100] Built in 1839, this elevator predated Dart's design in 1842, but was also far simpler and would not be considered a grain elevator by today's standards. Raising a small amount of bushels in bags, rather than loose grain, this elevator represents Burling's first industrial commission. In 1852, Burling formed a partnership with Edward Baumann, and together they designed several more grain elevators in the years leading up to the war, including the steam-powered elevator for Dole and Armour Company in 1854. This steam powered elevator, built on the South Branch of the river, was the first of its kind in Chicago, and was "much more like the monster elevators of today than was the humble building of Newberry and Dole in 1839."[101] These elevators attest to Burling's previous experience with industrial construction methods, and he even employed pile construction in several of these buildings.

Once Adler joined Burling after the Civil War, their work mostly included commercial and residential buildings. The majority of their work was characterized by the building frenzy that occurred in Chicago after the Great Fire of 1871. Together, Adler and Burling erected dozens of buildings in Chicago's downtown Loop in the years that followed the fire. The high number of commercial and residential buildings they constructed during this time ensured the firm a prestigious reputation. Some sources suggest that they continued to build a few grain elevators as well, but this building type certainly did not dominate their work at this time.[102] Although these claims have been difficult to corroborate, Adler was certainly exposed to Burling's grain elevators at length, even if he did not design his own. During this time, Adler likely learned of the pile foundation techniques that he later discussed in his article in 1891, twenty years after he began working with Burling.

Directly referring to their mutual work on grain elevators, Adler wrote, "It is not at all flattering to Mr. Burling, to the late Mr. Edward Baumann, to myself, who have all had charge of the design and construction of grain elevators and buildings along the river front...that we failed to apply the lessons there learned to the use of our clients, who have since then placed us in charge of the erection of business buildings."[103] Displaying remarkable confidence, Adler contemplated the mistakes he may have made in his career, out loud. Adler cites his own 'failure,' along with his mentor and partner, in not transferring his experience with pile construction from grain elevators to tall office buildings. Marveling at this missed opportunity, Adler reflects:

> When I look back upon my connection with the development of foundation construction in Chicago, I find it difficult to determine by what combination of mental processes my attention was diverted from the true solution of a difficult problem, which was already in my grasp many years ago. Perhaps had I been called directly from the design of one of these to the design of a modern 'skyscraper,' we should not have fallen into the error of forgetfulness of a good work already accomplished.[104]

In noting this 'good work already accomplished,' Adler credited the grain elevator with the earlier use of pile foundation construction methods than the skyscraper. He acknowledged his own prior experience with the method, and questioned his failure to apply that experience to the same problem in a different context. The structural challenges related to foundations and building settlement issues may have been a particular concern for Adler on a personal level as well, as his work on the Auditorium Building in Chicago (completed in 1889) was subject to litigation due to the fact that it continued to sink into the ground into the mid 1920s.[105] Perhaps, as Adler himself suggested, he did not initially make the connection between the similar challenges and solutions faced by both building types simply because he viewed them in separate contexts.

Adler also held a valuable position in this era, as seemingly few designers had experience with both grain elevators and skyscrapers. His engineering background made him well suited to handle the intense technical nature of grain elevators, but his experience at architecture firms, first with Burling and then with Sullivan beginning in 1881, quickly earned him a reputation in skyscraper design. Perhaps he was not 'called directly' from designing a grain elevator to designing a skyscraper, as he mused, because they were often categorized as entirely distinct building types. Despite their shared challenges and structural concerns, which Adler himself recognized, grain elevators and skyscrapers were frequently commissioned to increasingly specialized firms who tended to design only one or the other.

The reasons for this slow adoption of pile foundation methods may therefore be even more related to professional divisions than they are to specific building function and design. During the 1870s-1900s, when Adler was working, the divide between architecture and engineering was becoming increasingly specialized. Historian Elyse McBride claims that this phenomenon "began in Chicago in the 1870s with the development of the...iron and later steel- skeleton building, which required the cooperation of the architect, the engineer, and the contractor, in joint service to the building owner."[106] If this is the case, then the development of steel skeleton skyscrapers, and their steel-bin grain elevator counterparts, directly influenced these professional transformations. The complex nature of steel structural systems, as architectural historian Thomas Leslie suggested, "exceeded the abilities of single minds, or even single firms."[107] The design, construction and completion of a building therefore required cooperation amongst various specialized entities, including architects, engineers, manufacturers and general contractors, rather than attempting to design all aspects of a building as had been done by prior generations of architects.

Acknowledging this professional divide even as it was occurring, Adler posited that it played a role in the missed opportunities that could have benefitted skyscraper design. Describing a process where "the building of elevators gradually drifted out of the hands of architects in general practice into those of a few specialists," he surmised that this specialization created a disconnect between engineers and architects.[108] Furthermore, Adler "respected engineers' contributions to architecture. He argued, in fact, that the architect must be an engineer as well as an artist and businessman."[109] Specialization, in Adler's view, cut off any potential dialogue that could share mutual challenges and solutions. He argued that this type of professional specialization could only be beneficial if older architects actively created a sense of continuity with their apprentices.

> The younger architects, who followed in our footsteps and...began simultaneously with us to wrestle with the problem of how best to construct the modern 'skyscraper' are not to be blamed if, instead of studying the history of our older works (neglected by ourselves), they assumed that our theory of foundation construction, as they found it, was the best that could be used, and then applied themselves with enthusiasm to the development, upon the basis of this theory of an improved system in the practice of foundation construction, adapted to the newly developed wants.[110]

Rather than reinventing the wheel, Adler hoped that aging architects would encourage the next generation of architects to study the history of their predecessors. 'History' in this context could indicate classical or ancient history, or even simply the more recent innovations made in the past few decades or century. In this sense, Adler pointed to history as a uniting factor to provide commonalities between the more recently divided fields of architecture and engineering, wherein future generations could build upon the advances of past designers. If younger architects had received some sense of history from their predecessors, Adler surmised, then perhaps he and his colleagues would not have "fallen into the error of forgetfulness of a good work already accomplished."

The grain elevator and the skyscraper, as Adler demonstrated, are bonded by similar challenges and, eventually, by similar solutions applied to those challenges. As a hybrid engineer/architect who had worked on both building types, Adler was particularly well suited to recognizing the similarities between these typologies and to communicating the mutual lessons they could share across these professional specializations. The division between grain elevators and skyscrapers, with engineers primarily building the former and architects associated with the latter, both reflected and instigated the professional divisions that occurred as these new building types developed alongside new technology and building materials.

Shared Media

As the fields of architecture and engineering underwent significant changes in the late nineteenth and early twentieth centuries, some scholars credit technological advancements with the transformation of these professional fields. The complex nature of steel, and the steel-skeleton frame, certainly coincided with the divide between the fields of architecture and engineering, as well as the appearance of the general contractor as a professional field. McBride claims that this specialization phenomenon "began in Chicago in the 1870s with the development of the...steel- skeleton building, which required the cooperation of the architect, the engineer, the materials manufacturer, and the contractor, in joint service to the building owner."[111] Historian Thomas Leslie also addresses the relationship between the steel skeleton building and professional specialization, noting the collaboration required between these increasingly divided fields. Pointing to the steel skeleton, he writes, "its successful implementation and gradual refinement under functional and cost pressures involved collaboration and communication among architects, engineers, builders, industrialists and clients. Tall building design in this era- as today- exceeded the abilities of single minds, or even single firms."[112] McBride similarly remarked upon the simultaneous development of specialized, distinct fields and the increased collaboration that new building materials and technologies required.[113]

Most historical narratives identify the skyscraper as one of the first building types to require this new form of simultaneous specialization and collaboration. By 1934 an article in the *Washington Post* declared, "No other example of human cooperation is so impressive as that which produces the vast complexity of a skyscraper."[114] Leslie notes that the complexity of "the tall office building required architects to adjust subtly their traditional roles as omnipotent master builders, and to cede important responsibilities in structural engineering and construction methodology."[115] Yet it should be acknowledged that a grain elevator, like a skyscraper, required similar teams of specialists to collaborate, including the "engineers, contractors, renting agents and specialists in all the 30-odd trades involved" that are often more associated with skyscraper construction.[116] Both building types, particularly as they manifested in steel at the end of the nineteenth century, required collaboration amongst diverse specialists in order to bring these structures to fruition.

This method of collaboration amongst specialists not only "changed the image of the architectural profession," but also changed the nature of architectural work.[117] Noting the new coordination that tall office building construction required, McBride described a process where "collaboration between specialists or, more specifically, specialist disciplines, was transferred to managers who...coordinated the various departments."[118] At the construction site, general contractors often took on this managing role, working directly with manufacturers while also coordinating laborers to execute the architect's and engineer's specifications on time. Before construction, however, the architect increasingly took on a managing role within the office, particularly due to the combination of specialization and collaboration that tall office buildings required. Leslie reflected on the professional changes that were directly inspired by this new building type, stating "Tall building construction...required greater specialization among consultants and, simultaneously, a broader function for architects as orchestrators."[119] The notion of architects as orchestrators, rather than as 'master builders' who completed all aspects of a building, changed the image of the profession. As architects began to "cede important responsibilities in structural engineering and construction methodology" to engineers and contractors,[120] they began to function more as "a businessman at the helm, to manage day-to-day functions and client relations."[121]

Although the image of architects as 'master builders' began to give way to an image of architects as orchestrators at the end of the nineteenth century, the profession did not lose its aura of egotism during the transformation. Reviews, professional journals, and popular magazines began to celebrate the architect's ability to coordinate and delegate, rather than create a building from start to finish. An article in the

Washington Post retrospectively revealed the new pedestal that architects were placed on at this time, stating "Pioneer architects share[d] their ideas fraternally...It is large mindedness such as this that made some of the architects of America seem not so very much smaller than the skyscrapers they designed."[122] While previously their "Godlike reputations...imbued the architect with mythical proportions," the professional image shifted to one that celebrated the large-mindedness of cooperation, of sharing ideas.[123] Due to these changes in building technology and construction methods, erecting a skyscraper was now increasingly viewed as "a matter of spirited team play, rather than the overseers whip."[124] Collaboration and organization, management and coordination: these were the celebrated qualities that architects were tasked with as new building types emerged at the end of the nineteenth century.

The shifting tectonics of professional specializations also led to new methods for sharing information, as professional organizations and journals began to take on increased importance at the end of the nineteenth century. Collaboration amongst disparate fields required a medium particularly well suited to enhancing communication. By this time, there were several professional organizations that enabled an individual to socialize within their profession, as well as interact with leaders of the profession and exchange ideas amongst colleagues.[125] While they encouraged collaboration, professional associations also emerged as a way of distinguishing specializations from one another. Professional organizations were established as early as the 1830s, but their membership numbers substantially increased in the last decades of the nineteenth century. Organizations such as the American Institution of Architects held their first meeting in New York City in 1836, but membership waned and dissolved shortly after. Architect

Richard Upjohn revitalized the organization in 1857, with Midwest chapters appearing in 1867. The American Society of Civil Engineers formed around the same time, in 1852. In order to separate themselves from other related professions, these organizations "established licensure requirements to protect the public and exclude those without training, and a code of ethics to define the character and responsibilities of the profession."[126] Admission to these organizations, Woods reflects, "was to be an honor extended only to a few," and therefore "this exclusivity reflected the growing specialization in building."[127] During a time when new building types required collaboration amongst varied disciplines, professional organizations emerged in response to these diverse teams in order to create distinctive boundaries between professions.

Professional journals performed a similar role at this time, serving as a medium through which professions could share knowledge, debate ideas, and make connections. Beginning in the last decades of the nineteenth century, "professional architecture journals served as the main medium by which ideas about building design and construction were exchanged."[128] Yet while professional organizations such as the AIA were inherently exclusive, it is difficult to ascertain exactly how much professional journals were read by audiences outside of their targeted professional audience: did architects read engineering journals, and vice versa? Furthermore, how much did the general public engage with these materials? While it may be nearly impossible to determine exact readership demographics, McBride aptly reflects that the professional journals themselves can today "provide us with insights into how architects perceived themselves and their profession."[129] Professional journals "made a significant contribution to the process of change" by publishing "articles that analyzed and discussed ideas, methods and innovations...as well as disagreements and discussions about how the architect should interact with other construction professionals."[130] Taking a closer look at the inclusion, or absence, of grain elevators and early skyscrapers in both architecture and engineering journals can thus reveal some of the stylistic divisions that were embedded in these specialized professions.

After conducting a study on a few major journals from each profession, a few trends appeared concerning the relationship between these building types and these professional divisions. Overall, grain elevators were discussed primarily in engineering journals, and skyscrapers appeared more frequently in architecture journals. This may be somewhat unsurprising given the historiographic treatment of these two typologies in subsequent decades, which highlight the differences between these building types, or hardly compares them at all. However, their inclusion in these journals indicates that the highly specialized division of professions was also reflected in their associations with different building types. Put simply, a closer look at these journals suggests that skyscrapers were viewed as an architectural subject whereas grain elevators were aligned with the realm of engineering.

The terms 'skyscraper' or 'tall office building' are exponentially more likely to appear in an architectural journal than one that is more targeted towards the engineering profession. Journals such as *Architectural Record*, *Architecture*, and the *Journal of the American Institute of Architects* produced virtually nothing on grain elevators from 1870-1930. The term 'grain elevators' appears only a handful of times in these journals, and virtually never as a topic specifically featured. Skyscrapers, however, captivated the attention of these journals and, subsequently, their architect readership at this time.

Articles with titles such as “Rationalizing the Skyscraper,” “To Curb the Skyscrapers” and “New York as the American Metropolis” grappled with the building type in *Architectural Record* in the 1910s.[131] Architects and architectural critics debated the skyscraper constantly in these journals during the first two decades of the twentieth century, often discussing its aesthetic appeal, programmatic function, and impact on the future of their own profession.

Two articles appearing in different journals in the same year demonstrate the different approaches to the same topic as conveyed by these specialized professions. The construction of the Woolworth Building in 1913 captivated both architects and engineers, and articles devoted to the topic appeared in disparate professional journals. When architectural critic Montgomery Schuyler published “The Towers of Manhattan and Notes on the Woolworth Building” in *Architectural Record* in 1913, engineer S.F. Holtzman published his article “Design of the Woolworth Building: Features of Substructure and Calculations for Wind Bracing of Tower” in *Engineering Record* that same year.[132] Many more articles on the Woolworth building were published that year, but these two provide a small sample indicative of the different approaches taken to the same building by architects and engineers. While Schuyler’s article examined the aesthetic effects of the building, Holtzman devoted his attention to the precise calculations of pressure forces and wind bracing techniques that were used to erect and stabilize the towering building. Even when these different journals featured similar buildings, they did so in a manner that revealed the fundamental differences of each distinct professional interest.

Grain elevators appear less frequently in both types of journals overall, but when they do it is far more likely to occur in a journal primarily devoted to engineering concerns rather than architectural ones. Journals such as *Engineering Age, American Builder,* and *Engineering and Building Record* featured grain elevators far more often than skyscrapers, particularly before 1910. In *Engineering Age*, for instance, grain elevators appear at least thirty-eight times before 1930, whereas skyscrapers appear approximately twice during that same time frame. These journals often focused on the construction methods and building materials used in erecting grain elevators, with article titles such as "How They Build Elevator Bins" and "Essential Features of Steel Construction" reflecting this interest.[133] Devoted primarily to sharing concerns and potential solutions for the structural challenges faced in building increasingly large grain elevators, engineering journals provided highly technical, specific information to its primarily professional readership.

Even in engineering journals, the visual depictions of grain elevators tended to illustrate mostly the exteriors of these structures rather than their internal plans. Images of grain elevators in *Engineering Age* typically emphasized the large scale, overall massing or site location of these buildings, focusing primarily on their exterior appearance (see Figures 3 and 7 for examples). Incorporating photography or lithography far more frequently than plans or other architectural drawings, this omission of technical detail for these buildings is somewhat puzzling. Drawings of patents, typically for the machines or conveyor belt systems that were inserted into grain elevators, were much more common in the pages of engineering journals, and this may be due in part to their ready-made availability in preexisting patent documents. For journalists looking to illustrate such a specific architectural concept, it may have been more difficult or time-consuming to hire a specialized illustrator who was familiar enough with these technical details to also render them in image form from scratch. Even as late as 1986, for instance, Banham hired a local architect, Donald Theurer, to create an image of the interstitial bin arrangement at the Great Northern Elevator for illustrating his argument in *A Concrete Atlantis* (Figure 2). Efforts like this one suggest that grain elevators were rarely illustrated through architectural drawings in this way, and therefore required hiring someone specifically suited to the task.

On the other hand, technical images of grain elevators had already been reproduced elsewhere by the early 1900s, and today can still be seen mostly in publications from grain elevator specialists and engineers. While illustrations of patented machines and gears were present in journals such as *Roller Mill*, more technical images of this niche type of architecture were limited to publications that were directly aimed at an audience of engineers engaged with the task of specifically designing grain elevators. Published in 1919 by the engineer and physicist Milo Ketchum, *The Design of Walls, Bins and Grain Elevators* contained several architectural images of grain elevators aimed to a more technically-oriented audience of professionals, including both exterior and interior photographs, section drawings of internal mechanics, several mathematical calculations, and even a plan for bin arrangement at the Great Northern Elevator that is remarkably similar to the image that Banham hired Theurer to create over seventy years later. Seen in Figure 15, Ketchum's images directly address the construction, function and design of the hemispherical cones used for grain deposits along with the internal plan of bins. These images appeared in a publication specifically devoted to elucidating the construction and design of grain elevators for engineering professionals, and the text is so technically written, and littered with complex mathematical equations, that it would likely have been read only by advanced professionals. Sequestered to a very specific and relatively rare niche market, architectural drawings of grain elevator designs were published only in obscure texts rather than in more mainstream professional journals such as *Engineering Age* or *Building Record.* Even Banham, who was certainly a specialist in grain elevators by the time he published *A Concrete Atlantis*, seems to have missed this obscure publication, and was therefore seemingly forced to redraw the bin plan at the Great Northern in order to illustrate his argument. Relegating the more technical aspects of grain elevators, and their architectural drawings, to only the most advanced or obscure contexts likely impacted and reinforced the public perception of grain elevators as buildings that were mysterious, illegible or solely relevant to engineers and professionals. Skyscrapers, however, appeared much more frequently in publications, displayed in a variety of plans, sections and photographs, therefore making their presence more multifaceted, discernible and relevant to a much more diverse audience of readers.

In general, there appears to be slightly more crossover between building types in engineering journals than in architectural publications. While grain elevators are virtually invisible in architectural journals, some skyscrapers do appear in journals such as *American Builder* and *Engineering and Building Record*. Skyscrapers appear in articles that grapple with new methods of steel frame construction, applying techniques to other building types such as grain elevators or bridges. Two other journals, *American Architect and Building News* and *Inland Architect*, reveal a large amount of crossover, blending architectural and engineering concerns substantially more than other journals. In

American Architect and Building News, for instance, skyscrapers appear 286 times before 1908, whereas grain elevators appear only 50 times. The latter, however, appears more often in full articles devoted to the topic, whereas skyscrapers are referenced in a broad range of contexts. The journal features some of the most instances of full articles devoted to grain elevators, typically examining their construction methods and building materials in great detail. Articles such as "Fire Proof Construction for Grain Elevators" appear alongside "The Building and Designing of the Skyscraper" in *American Architect and Building News*, demonstrating its inclusion of a diversity of building types.[134] United by an interest in building materials and construction methods, journals such as *American Architect and Building News* and *Inland Architect* typically featured articles on both building types, appealing to a combination of engineers and architects.

Professional journals were not entirely exclusive to one particular readership or another, as some articles were simultaneously published in both architecture and engineering journals. One article in 1904, for instance, appeared in both *Engineering Magazine* and *The American Architect*, addressing audiences of both professions. Written by an engineer, R.P. Bolton, the article lamented that architects neglected to consult engineers when constructing tall office buildings. Printed first in *Engineering Magazine*, the article clearly aligns itself with the professional interests of engineers, stating "if architects were interested in producing quality buildings, then the situation should be rectified through the use of the specialized services of the engineer."[135] Publishing in *The American Architect* later that year, Bolton's statement takes on a new sense of urgency, attempting to bridge the gap between the professions in order to collaborate and produce better, safer buildings for the general public. The very act of this dual publication suggests an aim towards collaboration across the divide between these two specialized professions, demonstrating the role that journals can play as a medium that both separated and united professions.

Publically oriented magazines also discussed skyscrapers and grain elevators at this time, although they performed a different function than the professional journals. While professional journals discussed these building types in terms of more structurally sophisticated and highly technical concerns, magazines such as *Harper's* and *Scientific American* were more concerned with how these new buildings worked, whether or not they were safe, and their presence in a constantly evolving society. As in the professional journals, skyscrapers were discussed far more frequently than grain elevators, which were perhaps not as visible in the daily lives of their urban readers. As writers attempted to absorb and interpret skyscrapers as part of a new American identity, *Harper's* published articles such as "The Modern Towers of Babel"[136] on New York skyscrapers and "Your United States: New York."[137] The latter article describes an experience of the skyscraper for readers, with powerful, dramatic interpretations: "You cannot actually go into the skyscraper without being impressed. You are in a palace. You are among marbles and porphyries. You breathe entirely in vast and brilliant foyers that never see daylight...You look forth from a window and lo! New York and the Hudson are beneath you, and you are in the skies...And you being to realize what a skyscraper is, and the poetry of it."[138] Descriptions like these did not actually convey any tangible architectural facts to readers, but rather sought to communicate the spatial experience of being inside.

Grain elevators typically appeared in *Harper's* only as part of a feature on a particular city, or referenced in passing as a "gaunt elevator by a railroad," usually as an example of "our industrial might."[139] By the 1920s, grain elevators did not appear more frequently in *Harper's,* but they were described more favorably. Descriptions began to romanticize these structures, much like other articles had done to the skyscraper, as the modern industrial aesthetic began to take hold around this time. One article described the grain elevator as "a great work of art," urging readers to "consider the lofty towers of these elevators, their rounded magnificence, marred by no fanciful nonsense such as pediments or porticoes or garlands."[140] While *Harper's* romanticized descriptions translated an artistic intensity to its readers, grain elevators appeared far more often in *Scientific American.* This publication took a slightly more technical approach, however, describing buildings for its readers in a more tangible way. Articles devoted to "How a Grain Elevator Operates" or "What Happens in a Grain Elevator"[141] attempted to elucidate the complex industrial processes that occurred behind the solid walls of bins, performing an essential function in demystifying these structures for the general public.

Overall, skyscrapers appeared more frequently than grain elevators in professional journals. It is difficult to ascertain exactly why grain elevators did not captivate the attention of these professions as much as skyscrapers, but it is likely due at least in part to the fact that the latter was far more present in the life of the average urban citizen than the former. As a commercial building type rather than an industrial one, the skyscraper was a far more relatable presence in most people's daily lives. For architects, skyscrapers were high profile building projects, and this meant they brought far more money and professional recognition than grain elevators. Furthermore, skyscrapers were at least partially open to the general public, able to be at least visited if not inhabited by tenants as office space. Grain elevators, however, did not invite the public inside; their walls were not transparent, nor were their functions.

Revisiting Form and Function

The simultaneous emergence of the steel skyscraper and the steel grain elevator bin articulated the search for structural legibility in remarkably similar ways. Although few have thoroughly discussed the striking similarities of these developments, the notable architectural historian Henry-Russell Hitchcock did remark briefly on this simultaneity: "While the battle [for skyscraper height and design] was fought out uptown and downtown, Dunbar continued to build great elevators along the lake front...Their vast, unornamented surfaces, bold cantilevers and clearly organized functional forms suggest architectural possibilities for America which even Sullivan hardly grasped."[142] Particularly amidst the 'form and function' dialogue that emerged in relation to the erection of the Guaranty building, it is especially curious that the grain elevators did not play a larger role in the discussion.

In "The Tall Office Building Artistically Considered," published just after the Guaranty building was completed in 1896, Louis Sullivan presented his ideals for skyscraper design as "form ever follows function." He wrote,

> Whether it be the sweeping eagle in his flight or the open apple blossom...form ever follows function, this is the law. Where function does not change form does not change...The tall office building should in the very nature of things follow the functions of the building, and where the function does not change, the form is not to change.[143]

Still frequently referenced over a century later, the mantra of 'form follows function' has been celebrated, criticized, misunderstood and reinterpreted by decades of architects and historians since Sullivan's initial statement. Although the originality and validity of Sullivan's statement has been debated, it undeniably made a remarkable impact on the development of modern architectural ideals. Scores of architects on both sides of the Atlantic used this statement in order to give shape to their developing ideals, contributing to the formation of modernism perhaps as much as any single building.

Although Sullivan's statement was profoundly influential, that did not make it infallible. Adler, Sullivan's partner until mid-way through the construction of the Guaranty building, thoughtfully amended Sullivan's statement. Shortly after Sullivan's essay was released, Adler presented his interpretation of 'form and function' to the AIA in 1896. He argued, "if 'form follows function,' it does not follow in a straight line, nor in accordance with a simple mathematical formula, but along the lines of curves whose elements are always changing and never alike."[144] Better to amend it, he stated, to say "function and environment determine form...using the words environment and form in their broadest sense."[145] Although far less simplistically potent, Adler's statement rings truer than Sullivan's in the context of Buffalo's skyscrapers and grain elevators. Determined as much by the environmental challenges raised by wind and foundational ground as by functional concerns, both types of buildings emerged in response to their urban context, material availability and efficiency. For Adler, an engineer rather than an architect by training, these factors were more closely related to the final form of a structure than any natural 'laws' or aesthetic concerns.

Despite Sullivan and Adler's assertion that form must follow function in the tall office building, not all architectural critics agreed that this concept had been successfully applied in many of the early skyscrapers before the turn of the century. Even Sullivan and Adler's own Guaranty building, which is still heralded as a pioneering step towards the marriage of form and function, has been criticized for its excessive use of terra cotta ornamentation. One architectural critic, F.C. Gordon expressed his disappointment in the excessive presence of exterior cladding and ornamentation, stating "Instead of trying to emphasize the internal construction in the external features...the façade is nothing more than an ornamental curtain of stone or brick, patterned arbitrarily after some past style, and intended chiefly to hide and disguise the construction."[146] Rather than pursuing structural legibility, Gordon suggested, many skyscrapers have "no more organic connection with the building behind it than a theatre drop curtain has with the stage scenery."[147] Removing this 'drop curtain' became a goal for modern architecture for decades to come, but it had already begun at the Electric Elevator during Gordon's own time.

When exposed bins began appearing on the exterior of grain elevators, Minneapolis architect E.P. Overmire remarked on the relationship of these bare bones to the skeleton frame that typified skyscraper construction at the time. His review of a new grain elevator, the Electric Steel Elevator Company in Minneapolis, reveals deeply rooted traditional beliefs regarding the role that aesthetics should play in industrial design. While Overmire appreciated the clarity that this functional exposure provided, he paradoxically lamented its lack of formal ornamentation. The departure from exterior ornamentation was not always welcome, and it is important to remember that even some American architects did not appreciate the aesthetic results of these highly functional elevator forms. The article is worth discussing at length, as his opinions on the differences between architecture and engineering provide excellent insight into some of the professional divisions and stereotypes that typified the turn of the century. In the trade journal *Northwestern Miller,* Overmire wrote,

> Somewhat analogous to the construction of our giant 'skyscrapers' the problem of elevator construction has been practically reverse, the bins in our latest and most up to date elevators standing entirely out of doors, each individual bin being a structure by itself and all being connected by means of the elevating and distributing machinery into a whole.[148]

The "problem of elevator construction" that he refers to here is an aesthetic one. Overmire approved of the hidden steel frames that skyscrapers adorned with exterior ornamentation, and would likely have praised Sullivan's terra cotta treatment of the Guaranty Building. Having previously worked in H.H. Richardson's office in Boston, Overmire was slow to see the beauty in industrial structures, as he specialized instead in revival style residences and churches. He begins his article with the sentence, "For many years the modern grain elevator has been intensely conspicuous by reasons of its huge ugliness."[149] Deeming them necessary but "homely" structures, Overmire viewed these structures as "immense blots upon the landscape whose influence has been anything but elevating."[150] His distaste for grain elevators provides an important reminder of their role in dividing aesthetic approval amongst viewers. Although celebrated Bauhaus architects praised their 'pure' form, many American architects, or simply those who aligned themselves more with European Ecole d'Beaux Arts traditions, resisted the technical appearance of the grain elevator's function.

Overmire's disapproval of grain elevators is aligned amongst the divide between form and function, between aesthetics and technology, and between the fields of architecture and engineering that were increasingly divided at the turn of the twentieth century. In the same breath that he voices his disdain for their appearance, Overmire states “the designing and construction of grain elevators...are admittedly engineering problems, pure and simple, to the point of consistent ugliness.”[151] Like many architects at the time, Overmire delineates the aesthetic concerns of architects from the technical concerns of engineers. Implying the superiority of the former over the latter, he writes, “Who ever heard of an engineer giving any special thought to the artistic side of his problems?”[152] This, he reasons, is the culprit for the ‘consistent ugliness’ of grain elevators: the lack of architectural sensibility applied to an inherently engineering problem.

While he aligns the grain elevator with the field of engineering, Overmire points to the skyscraper as a counter-example intended to demonstrate to the positive aesthetic impact that an architect can have on an equally technical building. He writes,

> It is a fact that beauty and utility may be advantageously combined in the same structure; witness the ‘skyscrapers’ in all our large American cities, which have become largely engineering problems, but which are redeemed from inherent ugliness by the magical hand and brain of the architect. Here is a case where both can cooperate to mutual advantage.[153]

Aside from the egotism that is embedded in the “magical hand and brain of the architect,” Overmire’s statement also reveals one of the key differences between the way that skyscrapers and grain elevators were both constructed and perceived. Aesthetic concerns, in Overmire’s view, distinguish the skyscraper from the grain elevator, securing it a more primary place in the architectural canon. Early steel skyscrapers like the Guaranty Building were built contemporaneously to early steel grain elevators like the Electric Elevator, often using the same materials, construction crews, and even engineers. Yet, as historiography has shown, skyscrapers have been imbued with more cultural and artistic value than grain elevators, despite the Bauhaus fascination with the latter as 'pure' objects produced by 'noble savages.'[154] Skyscrapers have been recorded and remembered as works of architecture, whereas grain elevators have been viewed primarily as feats of engineering. Overmire's statements reflect this alignment, acknowledging and revealing that the skyscraper and the grain elevator may be two sides of the same coin, but are often perceived under vastly different terms and divided amongst two seemingly opposing professional fields.

Sullivan's consideration of the relationship between architectural form and programmatic function also confirmed the centrality of the tall office building, or what became the iconic American skyscraper, in architectural debates. At the same time this was occurring, however, few architects in this realm took notice of the engineers that were constructing innovative grain elevators made of steel along the waterfront just a mile away. Although it took a few decades for architects to recognize the beauty of utility in their exposed bins, they later celebrated the form and function of elevators like the Electric in remarkably similar terms to Sullivan. Amedeé Ozenfant, friend of Le Corbusier and one of the founders of the Purist movement, wrote of the grain elevators,

> I was struck by their majesty...being admirably sober in form, though unintentionally so. This was not the work of artists but of anonymous engineers. *Function* was greatly satisfied thanks to excellent cooperation between the forces involved in the equation *function* and *construction*. This willing association produced satisfactory forms like many of those Nature created on her own.[155]

Echoing Sullivan's praise of natural laws, Ozenfant discusses the grain elevators as if their form was a happy accident resulting from the "anonymous engineers'" pure focus on function. Here, as in the debate between Sullivan and Adler, the relationship between form and function is subtly yet remarkably aligned with that of architects versus engineers. In Ozenfant's statement, function produced form, much like Sullivan's statement that form ever follows function.

Clarity of function, and its expression in final form, was indeed one of the grain elevator's most attractive qualities to Bauhaus founders of the modern movement, as well as many other European architects. Even before the Bauhaus was established, European architects such as Berlage and Behrens had celebrated American grain elevators for their geometric forms, smooth and unadorned surfaces, and clear relationship between internal function and exterior appearance. In America, publications such as *Harper's Monthly Magazine* also marveled at the grain elevators for their 'purity,' romantically urging readers to "consider the purity of the lines rising sheer; the elevator is like a turreted castle, spectral white, and as free from excrescences as the phrase of a great prose writer from useless words...I have seen the cathedrals of America, and her grain elevators. I have seen nothing nobler than these factories of the moon."[156] By 1913, Gropius was clearly drawn to this 'purity of lines,' which he identified in the relationship between form and function in the grain elevators. He stated, "They have an architectural image of such convincing impact that the spectator cannot help but grasp the meaning of the building."[157] Yet, as Banham and Brown have already shown, Gropius was seriously confused about the ways in which grain elevators actually functioned.[158] Regardless of his true understanding, Gropius' assertions about the "self evident" relationship between grain elevator form and function made an immense impact on architectural dialogue henceforth.

Others repeated and advanced Gropius' arguments, even reproducing the grain elevator photographs from his *Jahrbuch des Deutschen Werkbundes* to assert their claims about purity of form and function (see Figure 16). When the photographs did not provide sufficient evidence of this 'pure' relationship, architects and publishers simply edited the images to better suit their arguments. Ozenfant even openly discussed making these edits in Le Corbusier's *L'Espirit Nouveau* publication, wherein he painted over the photograph in gouache to erase the triangular pediments atop the silos of the Bunge y Born elevator in Argentina (Figure 17). Claiming that the Greek-style pediments disrupted his narrative of pure form and function, he wrote in his memoirs, "The engineer, or some architect hanging around the drafting table, must have wanted to 'embellish' the technicians' pure work, as though one could embellish an egg...I eliminated these outgrowths with gouache, so that everything attained- or rather returned to- its pure state."[159] Bending a building to suit his dialectic vision, Ozenfant, and likely Le Corbusier, clearly believed that this photographic tampering was merely a remedy to an architectural injustice. These edits suggest that Ozenfant and Corbusier believed that clarity of function, and nothing more, should be expressed in the architectural form of a grain elevator. When seeking a transparent relationship between form and function, then, it is a bit surprising that the solid mass of many grain elevators were so frequently chosen as the example of this dynamic- as their interior functions were often hidden from the naked eye between a barrier of brick, steel, or concrete. Additionally, it seems that in the quest for pure form and architectural legibility, onlookers did not always like what they could see.

The division between form and function often aligned with the distinctions between architecture and engineer, as well as between European and American design sensibilities. The relationship between grain elevators and skyscrapers, as presented in trade journals, architectural manifestos and popular magazines, illuminates these divisions while also revealing the blurred lines between them. As skyscrapers began to soar to new heights in the first decades of the twentieth century, American architects, as one journal noted, "heard considerable criticism by foreign architects of the great height of American buildings which, at first, they found extremely ugly....[now] the European is commencing to praise the skyscraper, both for its beauty and its utility."[160] Later embracing this 'beauty and utility,' which is notably similar to the relationship between form and function, European architects eventually adopted skyscraper construction techniques in their own cities. This process of adaptation was remarkably slower than the insertion of grain elevators into European countries, which were constructed a few decades before the skyscraper appeared in Europe.

European architects did not build skyscrapers until the 1920s, and the 1950s in earnest, which was several decades after they first appeared in America. Grain elevators, however, were more quickly adapted to European locations, and were constructed in Germany and Holland at least as early as 1896. The Holland America line, for instance, constructed four rudimentary grain elevators by 1900 in Rotterdam, the largest grain port in Europe at the time. In general, these elevators were not as sophisticated as their contemporaneous counterparts in Buffalo, and were built mostly of wood or brick even as American examples began incorporating steel. By 1908, however, the well-known firm of Wayss and Freytag constructed a grain elevator in Worms, Germany, which was one of the earliest concrete examples of the building type in Europe at the time. Although concrete grain elevators began appearing in America nearly a decade earlier with the Peavey-Haglin elevator in 1899, the Worms Elevator represented an early attempt to adapt the building type to European needs. Notably, Mendelsohn also reproduced an image of the Worms Elevator alongside one of the Washburn-Crosby Elevator in his 1919 lecture "The Problem of New Architecture."[161] With oddly shaped triangular bins, however, the Worms elevator still required a few more stages of engineering innovation, and it was not until 1922 that the Barby an der Elbe elevator brought the American forms and methods to fruition in Germany. Brown identified the relation between these two German elevators, stating "When the Worms Elevator was constructed, German industrial engineers had been pursuing a course that was completely independent from the one followed by their American counterparts. By 1922, [when the Barby an der Elbe was built,] their respective courses had merged and become virtually indistinguishable."[162] With two parallel rows of cylindrical concrete bins arranged under a horizontally-oriented headhouse, the Barby an der Elbe has been recognized by some historians as the first complete expression of American grain elevator form in Europe.

Emerging roughly ten years after concrete grain elevators were built in America, European architects and engineers experimented with the early stages of grain elevator design long before they were willing to adopt the skyscraper as a suitable building type. This earlier absorption may have been due at least in part to the purely physical needs of European nations, where grain elevators could store and process grain in order to feed growing populations. With more immediate, practical applications than a skyscraper, the grain elevator may have simply seemed more economically feasible, valuable and therefore necessary than a skyscraper. Furthermore, European construction methods "remained highly conservative for the first quarter of the twentieth century."[163] American slip form construction did not appear in Europe on a large scale until the 1930s, and European cement technology "lagged behind that of America for the first two decades of the century."[164] Elevator historians Thomas Leary and John Healey attribute this lag time in part to the abundance of relatively inexpensive labor in Europe at the time, which provided little incentive for adapting American construction methods and materials.[165] In addition to this, however, it is also possible that the grain elevator's alignment with American engineering was a bit less threatening to European designers than the innovations embedded in the skyscraper as a symbol of the American contribution to the field of architecture. European designers could perhaps justify the construction of a grain elevator on purely practical grounds, whereas adopting the skyscraper may have required a larger acknowledgement of the superiority of American architects in regards to that particular building type.

Conversely, American grain elevators proved to be stylistically influential in Europe as well, and were applied to other building types and emerging architectural designs beginning in 1910. Even though little evidence exists of their direct influence, the unadorned, geometrical, smooth surfaces of the grain elevators find some resonance in a broad range of European architecture, including Behrens' AEG Turbine Factory in Berlin and Berlage's Commodity Exchange in Amsterdam. Behrens, a member of the Werkbund along with Gropius, designed the AEG Turbine factory in 1909-1910, a year before Gropius first publicly mentioned American grain elevators in his 1911 lecture, "Monumental Art and Industrial Building." Mies Van der Rohe, Adolf Meyer and Le

Corbusier also worked with Behrens during this time, and it seems likely that American industrial building, particularly the grain elevators, may have influenced the design of the AEG Turbine factory. As at the grain elevators, the building towers at a monumental scale, where there is a close relationship between the industrial process and the architectural product.

Contemporaneously, the renowned Dutch architect Hendrik Petrus Berlage traveled to America in 1911. Like Behrens, Berlage also worked with Mies van der Rohe early in his career, where they likely discussed American influences in the years leading up to and after Berlage's visit to the country. On this trip, his visit to Buffalo proved highly influential to his subsequent work back in Amsterdam on the Commodity Exchange building. His lectures indicated that Berlage was particularly impressed with Adler and Sullivan's Guaranty Building and Wright's Larkin Administration Building. Inspired by Richardson's brickwork several years before he crossed the Atlantic, Berlage also likely visited the Buffalo State Asylum for the Insane (now known as the Richardson-Olmstead Complex) and the William Dorsheimer House while in Buffalo as well. Visiting the Guaranty Building in downtown Buffalo was also pivotal for Berlage, who continually reworked his stance on cladding iron or steel walls with ornamentation. Shortly after his visit, Berlage wrote, " We architects must first study the skeleton...For the cladding of every natural object is an exact reflection of the inner skeleton...it is necessary to study the skeleton in order to arrive at once again the full body, but without the confusion of clothing."[166] Admiring the marriage of aesthetic and function in what he called "the naked wall in all its smooth and simple beauty," Berlage infused these examples from Richardson, Sullivan and Wright into his own buildings in Holland.[167]

Berlage was even more impressed by Wright's Larkin building, and thoroughly described his visit to the building in his 1908 essay for *Architectural Record,* "In the Cause of Architecture." He wrote, "I left convinced that I had seen a genuinely modern work, and I am filled with respect for the master who created something that to my knowledge is without equal in Europe."[168] As perhaps the first major European architect to articulate and encourage Wright's work in European circles, Berlage played an important role in translating American design across the Atlantic. Finding echoes of his own values newly expressed at the Larkin building, Berlage described Wright's work as "a building [which] proclaims itself a large, solid mass, with powerful, smooth wall areas."[169] These smooth walls, which hark back to his interpretation of Richardson's brickwork as well, were also clearly present in the grain elevators during Berlage's visit to Buffalo in 1910. Although it is unclear if he made the trip two miles south to see them in person, it seems very likely that Berlage would have been aware of, and even influenced by, Buffalo's grain elevators. In 1913, five years before Le Corbusier and Ozenfant acknowledged their influence, Berlage extolled the "pure cylindrical geometry and unacknowledged majesty of the North American grain silos."[170] Their smooth concrete surfaces, geometric clarity, and nearly skeletal forms would likely have impressed Berlage on his trip to American in 1910, who himself believed geometry should be the basis of architectural design, which he defined as "the art of spatial enclosure." Whether or not he visited these particular grain elevators in person, Buffalo's architecture, produced by a diversity of highly influential designers, clearly inspired Berlage to absorb and adapt the seemingly pure forms of American architecture to his work in Amsterdam a few years before many Bauhaus architects did.

A decade later, the noted architect Walter Behrendt conceded the superiority of American construction methods over European engineering models. In an article he wrote for the *Journal of the AIA* in 1923, "Skyscrapers in Germany," Behrendt stated, "In technical construction the German projects will seem familiar to American architects, because in this respect they closely imitate the American model. Imitation, in this case, is fully justified, for it seems hardly possible to devise anything better than the American engineers' steel cage construction."[171] Aligning American ingenuity with engineering, Behrendt credits the nation with technical innovations yet pointedly does not concede the superiority of European architectural design in the realm of aesthetics.

When Behrendt readily admits the impact that American engineering innovations had on European construction henceforth, he also makes an important connection in linking the skyscraper to the grain elevator. He wrote in *The Victory of a New Building Style*, where several images of Buffalo's grain elevators also appeared:

> To do [it] justice...it was the example of America that gave the impulse to the German architects when they first tried to clarify the problem of structure. To be sure, this impulse did not originate in the skyscraper...but in the simple structures of industrial building such as the grain elevators and big silos to be fond in the great ports.[172]

According to Behrendt it was the grain elevator, not the skyscraper, that served as the origin of what he identified as the American "pure use of form," the source of the nation's first major influence on Europe.[173] The modern grain elevator, however, with its exposed geometric forms and exterior cylindrical bins, did not truly appear until 1897 with the Electric Elevator, and thus chronologically developed simultaneously to, or even very shortly after, the steel framed skyscrapers that began dotting American skylines in the 1890s. In light of this, Behrendt's assertion that this 'pure use of form' originated in what he calls the grain elevator's "simple structure" is puzzling. Unlikely a result of mistaken facts or faulty research, Behrendt's claims that the grain elevator is the source of the first true American contribution to European design must also be couched in Banham's discussion of Gropius' treatment of these same structures.

Gropius, like many subsequent Bauhaus architects and other European designers, presented grain elevator engineers in his *Jahrbuch des Deutschen Werkbundes* as what Banham described as "the newer kind of artist-hero, the noble savage."[174] Responding to Gropius' claims that in "America, the Motherland of Industry...American builders have retained a natural feeling for large compact forms fresh and intact,"[175] Banham asserts that this statement revealed an underlying European vision of American engineers as both backwards and somehow pure. For Gropius, he writes, American builders "have the added authority of coming from the Motherland of Industry, the American lands where Europeans had first discovered what they believed to be noble savages, unspoiled peoples who had retained those human virtues that sophisticated Europe had mislaid."[176] Even when crediting American builders, Gropius uses terms like the 'Motherland of Industry' and 'natural feeling' to imply, whether intentionally or not, that American builders stumbled upon these solutions from a pure standpoint that was enabled by their distance from Europe and European traditions. Behrendt's simultaneous assertion that these same 'simple structures' were influential to German architects gives American builders a bit more credit. However, his claim that it was these industrial structures that served as the origin of the American 'impulse' for clarity of form is somewhat chronologically inaccurate, for the steel skyscrapers developed almost contemporaneously to the modern grain elevator. When discussing the 'Motherland of Industry,' grain elevators simply may have provided more compelling evidence for Behrendt to assert the technical prowess, rather than stylistic innovations, of American design.

American architecture then, was finally seen as influential to Europe rather than the other way around - but only on a technical level rather than an aesthetic one, and only by happy accident. Echoing the noble savage approach that Banham outlined in Gropius' text, English architect Alfred C. Bossom expresses the concept in more direct terms. Notably, he does so while discussing the skyscraper, not the industrial grain elevator, in a manner that indicates how deeply embedded the noble savage concept had become, extending beyond merely industrial architecture. Delivering a backhanded compliment to American designers, Bossom wrote the skyscraper is "as indigenous as the Red Indian. It is not a copy of something that has been done elsewhere...It is a creation entirely original to herself (America) and emphatically, comprehensively-if you like, stridently-American."[177] In his attempt to posit the skyscraper as something uniquely American, Bossom reveals himself as part of the inherently European noble savage complex. While crediting the nation with an "entirely original" building type, he references the "Red Indian," a blatantly racist approach by today's standards, in literal accord with the noble savage concept. As if born of native soil and miraculously untouched by European traditions, Bossom depicts America as finally coming to fruition in a unique and independent building type, manifested by the form of the skyscraper.

Banham was spot on when he noted the implied superiority of European design in this type of noble savage depiction, but he barely touched on another dichotomy embedded in the differences posited between European and American design in this kind of narrative. Pitting architecture against engineering, the divide between these two professional fields was increasingly echoed by the divide between European aesthetic traditions and American amnesic technical innovations. Several binaries that continually arise in this study tend to align with one another, as the divides between architecture and engineering, form and function, and skyscrapers and grain elevators tend to reveal similar themes. A nationalistic binary between Europe and America aligns with these divisions as well, although like the others it proves to be far more fluid than it initially may seem.

Boasting a rich tradition of cultural and artistic heritage, European architecture is, on average and quite simply, much older than the American built environment. The relative youth of American architecture has long produced an inferiority complex in the nation, and much of the nation's architectural history represents a search for a uniquely American architectural style. The revival styles that dominated much of the late-eighteenth and early-nineteenth centuries perpetuated this European mimicry, albeit often with a blend of American building materials or other hybrid approaches. Several new architects and styles emerged during the late-nineteenth and early-twentieth centuries, as American industry made new building materials and methods possible. While some scholars credit Sullivan as the 'father of American architects,' or Wright and Richardson as the pioneers of an American style, others perhaps more justly assert that it was industrial architecture that represented the first uniquely American contribution to the global history of modern design. As the search for uniquely American styles came to the forefront of architectural debates, new approaches were often compared to European examples in high relief contrast.

While the assertion that industrial architecture, grain elevators among that category, was the first truly American building type may be true, it is also laced with hierarchal values coded in architectural terms. America simply could not compete with the age of European buildings, or with the centuries of styles that they represented. American designers soon realized that the nation's industrial materials and methods, however, could be used in innovative ways, evidenced by the use of steel in both grain elevators and skyscrapers. This, in many European architects' mindset, was not Architecture, but Engineering, and therefore did not represent a significant cultural contribution but rather an innovative technical one. McBride reflected on this divide, stating, "European architects enjoyed a superior status because a higher cultural value was placed on decoration than on construction...they believed that the stature of the Chicago architects had been tarnished by their intimate relationship with engineers."[178] Decoration rather than construction, form rather than function, and architects rather than engineers were placed at the top of a hierarchy embedded in these value systems, which also placed European designs over American ones. While these binaries merely represent stereotypical views and can easily be broken down, they were in place during the time when both the skyscraper and the grain elevator emerged as distinctively American building types for different reasons, one for its form and the other for its function.

<u>Part Three: American Icons</u>

European views of grain elevators and skyscrapers are only one part of this complex history. Although the historiographical treatment of skyscrapers and grain elevators has been markedly different, both are frequently depicted as distinctively American building types. Contemporary textbooks point to both the skyscraper and the grain elevator as specifically American contributions to the history of architecture, just as professional journals, newspapers and popular magazines identified their national importance when they emerged in the late nineteenth and early twentieth centuries. Although they were written for different audiences and decades apart, *The American Architect and Building News*' comment in 1876 that the grain elevator is "a building at once peculiarly new and peculiarly American," aligns tightly with the *Washington Post*'s statement in 1934 that the skyscraper is "typically and exclusively American."[179] Though rarely compared with one another directly, the grain elevator and the skyscraper share an important place in the global history of architecture as two of the first contributions to be recognized as distinctively American building types.

Even the building materials inside the skyscraper and grain elevator became associated with these typologies as typically American features. Steel, and then concrete, made these impressive heights possible, as the history of both typologies has shown. In his book on the subject, architectural historian Adrian Forty writes in *Concrete and Culture*, "In the early 1920s ...the United States was identified as the nation of steel, and Europe the land of concrete....The supposition that concrete was not an American material rested primarily on the fact that most skyscrapers, at least in New York and Chicago, were steel framed."[180] Because skyscrapers were specifically American building types, he supposed, the materials that made the type possible became specifically American as well. Of course, steel and concrete were used in skyscrapers, and grain elevators, in both countries, but Forty's statement attests to how deeply aligned the steel skyscraper was with American identity.

This identity was further solidified in the first half of the twentieth century, when European architects such as Gropius, Le Corbusier, Behrendt, and Mendelsohn emphasized, each in their own way, both the skyscraper and the grain elevator as essentially American building types. Architectural historian Harry Mallgrave observed this phenomenon in his textbook, *Modern Architectural Theory*, stating "The two images of the American landscape most often published in European architectural journals in the 1920s," were indeed "the grain silo and the skyscraper."[181] As Banham demonstrated in *A Concrete Atlantis*, the images circulated by these influential European architects were instrumental in the development of modernist ideals. While these photographs were extremely influential, they were not the only images of these structures, and Bauhaus architects were certainly not the only viewers. American painters, photographers, advertisers and tourists also created visual representations that express a fascination with these buildings, both locally and internationally. In addition to those published in American professional journals, many images of skyscrapers and grain elevators were produced by Americans in the early twentieth century, particularly in the form of photographs, paintings and exhibitions. Nearly all of them portray these one or both of building types as American icons, identifying them as two of the first unique contributions to the nation's young history of design. Artistic interpretations of these structures, particularly those created by American artists attempting to interpret 'Americanness,' thus provide a fundamentally different kind of insight into the grain elevator and the skyscraper than European architects did.

Artistic Interpretations

Paintings of grain elevators and skyscrapers emerged during a time when nationalistic debates were increasingly concerned with identifying the 'real' America. As art historian Wanda Corn asserts, "The concern for defining and defending 'Americanness' that historians find so integral to the 1930's was first formulated in the preceding decade, when the standard of living in this country became the highest it had ever been."[182] By 1920, the call for a national form of expression "had become a near obsession-due in part to the new importance of America on the postwar international scene."[183] Architecture played a central role in negotiating this new American identity. Was the real America in the new towering skyscrapers of New York, or in the grain elevators on the outskirts of downtown? Echoing a broader political search for the role of America on the international scene, the search for an American style loomed large in both architectural and artistic movements during these decades. In architecture, the nearly simultaneous emergence of the modern grain elevator and the skyscraper each signified various responses to the challenge of defining a new, distinctly American style. Artistic movements reflected a similar quest at this time, as a diversity of styles appeared in order to provide their own varying interpretations of 'Americanness.' Particularly in the 1920s and 30s, an increasing cultural awareness of the new 'machine age' thrust industrial architecture into the forefront of this ongoing discussion.

By the 1920s, industrial architecture was closely aligned with America's new conception of national self. Industrial innovations, rather than age-old traditions or a lengthy history, identified the country as distinct from Europe. Art historian Barbara Haskell reflects, "As a preeminent industrial power, America was a symbol of the future."[184] Emerging successful from the First World War, America's rapid advancement to the forefront of the international scene was intricately intertwined with its industrial innovations. Grain silos, factories and rail yards were featured prominently in artworks by Precisionists like Charles Demuth and Charles Sheeler, to the extent that historians now attest, "Modern industrial architecture was the quintessential Precisionist subject."[185] Demuth scholar Betsy Fahlman has noted the direct relationship between architectural subjects and Precisionism, observing "The hard edges of the highly practical buildings they painted appealed to their sense of linear abstraction."[186] Demuth's devout attention to line, form, geometry and tightly stacked compositional organization made his work easily identifiable with the Precisionist movement. His work was often compared to that of Sheeler, who similarly experimented with these stylistic qualities in his depiction of industrial subjects.

Yet it was not simply the formal qualities of architecture that appealed to Precisionist artists, but also the potential to examine buildings in the cultural context of this era. Industrial architecture was a subject particularly resonant with the Machine Age of this era, and Precisionist artists sought to digest, interpret and express their increasingly complex role through new stylistic forms. Like other Precisionists, the painter Demuth expressed a mechanical precision of geometric lines and compositions in the industrial structures themselves. This was not a mere convenience of cultural context, nor a simple cause-and-effect scenario, but instead, "Demuth's style of modernism was consciously informed by the machine aesthetic of his era."[187] Mutually reinforcing one another, artistic process and architectural expression aligned to express and interpret the ever-present notion of the machine during the early 1920s.

Perhaps more so than any other time before or since, industrial architecture was thrust to the forefront of American consciousness. Grain elevators in particular served as a vehicle for grappling with the newly dominant presence of industry in American life. Architecture and urban space became fundamental components of a larger nationalistic search for cultural identity, and, because this was the Machine Age, industrial structures were vehicles for negotiating these concepts. This was a time when the American public was not only aware of the presence of industrial architecture in their daily lives, but also a time when popular culture, artistic movements, and architectural circles were increasingly saturated with images of structures, particularly grain elevators. Correspondingly, America's industrial architecture began to occupy a new niche in architectural manifestoes, professional journals, and of course, artistic realms during this time.

Simultaneously, the art world was captivated by the desire to both translate and transcend a place, to emphasize both the particular and the profound. Images of grain elevators by Charles Demuth provide an excellent comparison with Georgia O'Keeffe's skyscraper paintings, and they can provide substantial insight into the artistic approach to these two architectural subjects during this pivotal era. As these building types increasingly dominated the skyline during the 1920s, these artists grappled with new ways of representing, transforming, and translating them for the modern American public. Their interpretations of grain elevators and skyscrapers therefore both reveal and reflect the cultural absorption of these new American building types as they appeared in the early twentieth century.

In both their art and their lives, Demuth and O'Keeffe grappled with the growing presence of these building types in their own backyards. Although few scholars have made this comparison at any length, these two American artists have a considerable amount in common. Though their stylistic techniques and approaches varied, both of these artists were often characterized, both stylistically and socially, as outsiders to the artistic circle they occupied. Notably, they both negotiated the boundaries between local and global subject matter in their work, occupying a tenuous position on the margins of many art historical categorizations. Their decision to paint from home in America, rather than predominantly abroad, made place a prominent theme threaded throughout their work.

Demuth and O'Keeffe painted scenes of their own backyard, although the views from their windows were notably different. Born in 1883, Demuth lived in Lancaster, Pennsylvania for the majority of his life, until his death in 1935. Although Lancaster is the subject of much of his work, it was not his only window to the world. After living in Philadelphia, where he befriended Charles Sheeler at the Pennsylvania Academy of Fine Arts and William Carlos Williams at a boarding house where they both stayed, he took three trips to Paris, both before and after WWI. Demuth also spent a few summers in Provincetown, Massachusetts and spent significant time in New York City. There, he befriended Alfred Steiglitz and his circle of artists, and formed a particularly close bond to Georgia O'Keefe, and they continued to correspond with one another for another decade before Demuth's early death, due to a long struggle with diabetes, in 1936.

Georgia O'Keeffe was born in Sun Prairie, Wisconsin in 1887, and grew up on a wheat farm there before attending high school in Madison. At a time when many American expatriate artists resided in European centers like Paris, O'Keeffe instead split her time between New York City and more periphery regions of America. Throughout her life, O'Keefe lived in many American regions, including Virginia, Texas and South Carolina, before settling for longer periods in New York City and New Mexico. Unlike many of her artistic colleagues, O'Keeffe did not travel to Europe until much later in life, after World War II. Scholar James Voorhies later cited this as fundamentally influential in her interpretations of America, as "Having never traveled to Europe, she became Stieglitz's icon for the authentic American-born modernist painter."[188] After meeting Steiglitz in 1917, and then marrying him in 1924, O'Keeffe became increasingly intertwined with the artists he surrounded himself with, including Demuth. Although they were both acquainted through Steiglitz by the end of WWI, they became closer friends in the early twenties, when O'Keeffe would visit Demuth in Lancaster alone, staying in the Weber hotel across the street from his house. Fahlman supposed their strong friendship was partially inspired by their mutual status as "outsiders in Stieglitz's artistic circle, Demuth as a homosexual and O'Keeffe as a woman."[189] Demuth and O'Keeffe continued to share a special bond until his death, when he left all of his remaining paintings to her in his will.

In an age characterized by expatriate artists residing in Europe, Demuth and O'Keeffe chose to paint their own backyards, both literally and figuratively. In doing so, they used grain elevators and skyscrapers as their primary subject matter. Although the views from their windows were remarkably different, as Demuth resided in Lancaster, PA and O'Keeffe in New York, they both used architecture to negotiate the continually evolving, interdependent relationship between place and national identity. Demuth painted industrial subjects, and grain elevators in particular, during two major periods of his career, first in the early 1920s and again in the early 1930s. Simultaneously, O'Keeffe completed the last major work in her skyscraper series, *Radiator Building* in 1927, the same year that Demuth completed *My Egypt.* Her approach to architectural representation is remarkably similar to Demuth's work, providing a meaningful juxtaposition between these two building types as well as between the artworks themselves. In these paintings, the grain elevator and the skyscraper provide the ground upon which both of these artists grappled with questions of national identity, of local value, and of the prowess and pitfalls of modernism. In doing so, their work expressed questions and concerns that were as prevalent during the machine age as they are now.

Demuth's Factory Fantasy

Towards the end of his career, his life and the Roaring Twenties, Demuth completed a seven-painting series of Lancaster's industrial architecture. The first painting in the series, *My Egypt* (1927), is the most celebrated of these works, and the only one in the series to be acquired during Demuth's lifetime, by the Whitney Museum of American Art in Manhattan (Figure 18). This painting is also the most universally recognizable of these works today, but the series as a whole stands as a significant moment in Demuth's career. Laden with cultural, artistic and personal significance, this series represents a body of work, "whose scale and formal power stand unsurpassed by any of his previous work. They remain the masterpieces of his last years."[190] Compared with his earlier industrial paintings, this series represented the next, and final, stage of Demuth's stylistic approach. One critic observed, "The Demuth piece is a factory fantasy of inspired angles. Diagonal light-rays lance two central cylindrical towers and drive the eye to the center of the picture."[191] Returning to the subject of Lancaster's industrial architecture with renewed vigor, Demuth depicted a monumental grain elevator, a fetishized object in geometric form.

In doing so, he achieved "a striking balance between abstractionism and realism"[192] that was less stylistically 'pure' than in his former years. Haskell reflects on the subtle, but powerful, stylistic evolution present in these later works, stating "Demuth's pre-1920 architectural paintings had been precisely drawn. He now created a sense of order and calm by combining this precision with geometric planes and smooth color handling."[193] Demuth's earlier experiments with cubist form had now come to fruition in the late industrial series, when he fused its geometric approach to architecture with his own individual expression of place. Demuth's lifelong struggle to paint Lancaster as a nationally relevant place came to fruition in this industrial series. Demuth "staked his claim as a Pennsylvania painter deeply established in the region, yet easily moving within the sophisticated milieu of an international avant garde." Although the series features solely 'provincial' Lancaster industrial scenes, Demuth's style appealed to a broader audience, gaining recognition in an international realm as well as a local one.

Demuth's later work may have elevated his status in an international realm, but a closer look at this series reveals that all seven paintings depict actual sites in Lancaster, each within a few blocks of the artist's home. *My Egypt*, for instance, depicted the John Eshelman & Sons grain elevator, built of reinforced concrete in 1919. Although the specific structure would have been recognizable only to a local Lancaster viewer, the Eshelman elevator would have evoked multiple associations for Demuth, who often operated simultaneously in local, national and international realms. Fahlman suggests, "This elevator held a complex meaning for the artist. It alludes to local agribusiness, the monumental tombs of the ancient pyramids suggestive of death (and by extension, Demuth's own fragile health), and even the biblical stories the artist had been told as a child."[194] Here, Fahlman identifies four basic themes that are integral to *My Egypt*: Lancaster's relationship to local farms, the universal fear of death, Demuth's personal health, and national religious connotations. Each of these meanings are expressed or evoked by *My Egypt*, as shall be examined in more detail. To that, I would add or expand some other themes that should also be more specifically addressed in the historical context of the Machine Age: Egyptomania, and a simultaneous attraction and revulsion to industry-perhaps best summed up in what historian David Nye has termed the 'technological sublime.'[195] Looking at each of these themes individually provides a richer understanding of Demuth's work. More importantly, it provides insight into his complex interpretations of industrial architecture- as both actual buildings and cultural concepts. When viewing these multiple themes together, their complexity as a unit attests to the multifaceted, evocative presence that grain elevators had during this time, captivating the general public, as well as artists and architects, for multiple, often conflicting reasons.

Beginning with the most local association that this grain elevator would have had for Demuth requires a closer look at the role of the grain industry in Lancaster. *My Egypt* and the next painting in the series, *Buildings*, *Lancaster* (1930) depict a grain elevator and a feed store owned by the same company, Eshelman & Sons (Figure 19). Placed sequentially in the series, these paintings are bound together by a common thread only understood locally-they feature buildings that were geographically adjacent, as well as owned and operated by the same company. Furthermore, there is an underlying current of ‘cause and effect’ industry in this pairing, bound together by grain. A site of industrial production, the Eshelman grain elevator, is followed by a site of consumption, the feed store. Farming and manufacturing are intertwined here, much as they were in Lancaster overall. Surrounded by farms, the city historically served as a hub for agricultural production and exchange. With an urban population of about 55,000 at the time Demuth painted *My Egypt*, Lancaster was not a metropolis like Manhattan, but instead was a relatively small city where agricultural and industry were deeply intertwined. In these two paintings, grain is central to both of these paintings, yet it does not physically appear. The industrial sites associated with grain’s production and consumption are instead of primary interest to Demuth, rather than the product itself.

Grain, however, is not one of the primary crops associated with Lancaster’s industrial economy. Whereas grain has figured prominently in the history and development of Buffalo, grain is marginal, at best, to Lancaster’s evolution. Other industries, particularly tobacco and linoleum, were far more vital to Lancaster than grain, and thus would have been accompanied by stronger local recognition than a grain elevator. Two paintings in the series, *Buildings Abstraction, Lancaster (*1931*)* and *And the Home of the Brave* (1931), depict buildings associated with Lancaster’s tobacco industry. In a city at the northern edge of the Mason-Dixon line, surrounded by small farms, the tobacco industry figured prominently in urban life, ranging from agriculture to manufacturing to commerce. By the mid-1920s, Lancaster County contributed more than 91 percent of the tobacco produced in Pennsylvania. Demuth himself had a close relationship to this industry, as his family had operated a tobacco shop on King Street since 1770. Tobacco thus figured prominently in his industrial interpretations of Lancaster, evident in his inclusion of two tobacco buildings in his series.

Another industry was even more closely associated with Lancaster's industrial sector than tobacco. Linoleum was perhaps the city's most significant industrial enterprise, and it was closely intertwined with one plant in particular. *Chimneys and Water Tower* (1931) and *After All* (1933) both depict the Armstrong linoleum complex at different stages of its corporate history. Fahlman insists "The corporate history of Armstrong is intertwined with the imagery of Demuth's painting."[196] Arguably, Armstrong was not only intertwined with Demuth's work, but was inexorably linked with Lancaster itself. The company employed over 2500 people in Lancaster during the 1920s, about one tenth of the city's population at the eve of the Great Depression. The city's economy thus had much at stake in Armstrong's success, and the company thus became emblematic of the promise of industry to Lancaster's citizens during the 1920s, and became a foreboding presence during the period of massive lay offs that occurred during the 1930s. Notably similar to Buffalo's relationship to the grain industry, Lancaster's dependent relationship to the linoleum industry was synonymous with the sprawling Armstrong complex on the edge of town. In Lancaster, to work in a factory during Demuth's lifetime meant to work at the Armstrong complex. Why, then, begin the series with two paintings associated with the grain industry? Several factors may have contributed to Demuth's emphasis on grain elevators, particularly when viewed in combination with one another.

Grain elevators were, quite simply, one of the most recognizable industrial structures during this time. The average American citizen during the 1920s and 30s likely had only a surface understanding of what actually occurred inside industrial structures- including how they functioned and what they made. A typical daylight factory, with its horizontal forms, large windows and boxy appearance, could have produced nearly anything inside, at least to the relatively undiscerning eyes of the general public. But while the exterior view of a factory may have given no clue as to what was made inside, be it automobiles or shoes, a grain silo or grain elevator, on the other hand, were indisputably linked with grain. The seemingly simplified geometric forms of a grain silo were easily distinguishable from a daylight factory, presenting a fundamentally different manifestation of the vague but powerful concept of 'industry' to a viewer who had relatively little architectural knowledge or experience. The tall, cylindrical forms of a grain elevator were instantly recognizable, providing clear visual cues to any passerby as to the products it held within. At a very basic level, the exterior appearance of a grain elevator was more legible to the general public than a typical daylight factory. While both may have been coded as 'industrial' in the inner minds of general citizens, grain elevators could be easily indentified in relation to their industrial products, whereas factories held more mystery about the products within their walls.

The ability to distinguish a grain elevator from other kinds of industrial architecture may have been a factor in Demuth's emphasis on this kind of structure. Grain elevators were, at a very basic level, more readily identifiable as a symbol of industry than a shipping facility or iron processing plant. Due to this instant recognition, the looming presence of industrial architecture in American life was perhaps more easily depicted through the simplified cylinders of a silo than through the inner workings of a factory. Perhaps Demuth began his industrial series with an image of a grain elevator in order to gain immediate traction with a broad audience. Constantly seeking legitimacy for his work beyond the borders of Lancaster, beginning his series with a grain elevator may have been an attempt to transcend regional boundaries and participate more directly in an international context. Grain elevators, after all, had become easily recognizable symbols of industry on both sides of the Atlantic. Furthermore, the geometric curves of a grain elevator's iconic cylinders would have appealed directly to the cubist sensibility of many artists who were inspired by their pure formal qualities, including Demuth. More so than any other industrial structure, grain elevators had captivated the imagination of artists, architects and the public alike. Demuth's choice of a grain elevator, rather than another type of industrial structure, therefore may have resulted from a combination of local and international associations with this kind of building, simultaneously representing a local, specific structure as well as an international icon of industry.

Grain elevators may have been architecturally legible in terms of their product, but they were particularly mysterious in terms of their process. As Banham has demonstrated, even trained architects were somewhat misguided in their interpretations of the mechanics of a grain elevator. Viewing the Washburn Crosby elevator complex solely from the outside, architects like Gropius and Corbusier misunderstood the function of some of its design.[197] An architect's understanding of these structures clearly differs from an artist's interpretation of them, as we will see later as this chapter unfolds. Yet if even trained architects experienced some confusion about the way these structures functioned, it seems likely that the general public would find their processes quite elusive. This illustrates an important component of the grain elevator's prominent presence in both visual representations and daily urban life: its compelling mystery, particularly to the untrained eye.

Demuth's earlier industrial paintings address the mysterious aspects of grain elevators, rather than their practical functions. Painted six years before *My Egypt* (1927)*, Nospmas* (1921) presents a notably different vision of this kind of industrial structure than his later work (Figure 20). Stylistic differences between these two artworks suggest not only Demuth's artistic evolution, but also his insights into the architectural function and presence of grain elevators over time. His earlier depiction of a grain elevator, in *Nospmas*, tends more towards abstraction than his later work. A study of line and form as much as, or perhaps even more so, than the grain elevator itself, *Nospmas* values the geometric qualities of this structure first and foremost. In contrast to his centralized, frontal placement of the grain elevator in *My Egypt*, Demuth instead depicts only a portion of the structure in *Nospmas*. Rather than place the structure in the compositional spotlight, Demuth offsets the cylindrical bins to the side and emphasizes the space between the silo and the plant instead, placing in the center of the painting. While the cylinders in the left portion of the painting indicate the structure is a grain elevator, they are provided only as a clue to the identity of this building. The structure in *My Egypt* is more easily identifiable as a particular structure in Lancaster, one that is recognizable as the Eschelman elevator due to its relatively accurate depiction in Demuth's work. The structure depicted in *Nospmas* is far more elusive, however, envisioned as a jumble of intersecting geometric forms rather than any particular building.

The resulting effect is one of obscurity, where the viewer is intentionally disoriented by Demuth's composition. During this part of his career, Demuth utilized a grain elevator for its formal qualities, transforming its shapes into a cubist experiment in style and an early precisionist take on industrial subject matter. His use of sharp lines, intersecting shapes, and modulated color blocks indicate that Demuth is most interested in the geometric aspects of the grain elevator, with a chaotic sense of industrial movements, hulking masses and mysterious processes that is somewhat similar to Mendelsohn's interpretations of the grain elevators on site in Buffalo. The compositional differences between *My Egypt* and *Nospmas* further illuminate his different approach to similar subject matter, or perhaps even the same building. While his later work depicts the structure in monumental, full-bodied form, *Nospmas* fragments the grain elevator, creating a sense of visual confusion and mystery for the viewer instead.

Characteristic of his earlier works, Demuth uses language to further convey the fragmentary, almost chaotic nature of this industrial scene. A few letters are scattered throughout the composition, most of which are cut off by the edges of the structure or the borders of the painting itself. 'FLOU' appears on the right-hand side of the composition, likely referring to 'flour,' and thus confirming the structure as a grain elevator. Yet the placement of these letters is even more significant than the words they suggest, pointing to the mystery of the scene rather than to the scene itself. Demuth intentionally positions these letters in a cluster of unintelligible groupings, evoking the garish presence of painted signs on billboards in the urban scene- a motif that shows up frequently in Demuth's paintings from this time, most notably *The Figure 5 in Gold (*1928). These letters bear no obvious relation to the structures in the painting, nor to the title. Instead, Haskell suggests, “these broken words underscore the existence of a symbolic structure in Demuth’s architectural motifs by suggesting arcane messages. Hidden and therefore never fully intelligible.”[198] Industrial architecture is made mysterious, through both Demuth’s composition and his use of these letters. Rather than use his cubist approach to the structure to clarify the underlying function of this grain elevator, it instead further abstracts the structure, emphasizing its unintelligible qualities rather than its purity of form.

The title similarly echoes this seemingly random jumble of words and buildings, further emphasizing the confusion of the scene. Some scholars have attempted to unravel the meaning of *Nospmas*, pointing to Demuth’s fascination for acrostic and cryptographic puzzles at this time, and suggesting that it reads backwards the name of his friend, ‘Sampson.’[199] The meaning of the title, however, is perhaps of less concern than its effect, particularly in predetermining the relationship of the viewer to this industrial structure. Issues of visual and verbal translation are strongly conveyed in both the title and the painting itself. In choosing a grain elevator as his subject matter, Demuth faced a common question shared by many of his contemporary colleagues: how to interpret the growing presence of industry in American daily life? In *Nospmas*, Demuth’s answer was chaos and uncertainty. Powerful new forms, intersecting wires, and a jumble of large painted signs are presented in *Nospmas* with dizzying results, illegible to the viewer’s eye as much as to the artist’s eye. The grain elevator, and its industrial presence in a rapidly changing urban landscape is, as Haskell suggests, “intentionally unintelligible” for Demuth during this period.[200] It is opaque rather than transparent.

When he returned to the subject of grain elevators just six years later after *Nospmas,* Demuth's vision of these industrial structures in *My Egypt* employs some of the same stylistic techniques, yet the compositional effect is remarkably different. Compositionally, *My Egypt* centralizes the grain elevator, depicting its complete elevation in a manner that elucidates rather than obscures its architectural cohesion. Unlike the fragmented images of industry Demuth presented in his earlier industrial series, "his [later] industrial images remain identifiably specific."[201] The contrasting compositions of *Nospmas* and *My Egypt* exemplify this shift towards specificity, as grain elevators transform from a series of partially visible geometric shapes in *Nospmas* into a clearly depicted grain elevator in this later work. In *My Egypt*, Demuth still emphasizes the geometric qualities of the grain elevator, but in a way that still enables the structure to be instantly recognizable as a grain elevator. Presenting its full elevation rather than a fragmented portion of the structure, Demuth has shifted his artistic approach for this type of industrial structure. Rather than presenting a fragmented cluster of industrial buildings as in *Nospmas*, *My Egypt* prioritizes its focus on one specific building, viewing this particular grain elevator as the primary architectural object of concern. As one critic observed, "he apparently feels compelled to block out the whole composition to the edge of the canvas. The effect produced is one of considerable weight and severity."[202] Far from the glimpse of a grain elevator he presented in *Nospmas*, *My Egypt* depicts a grain elevator that indeed remains 'identifiably specific' as the Eshelman grain elevator just a few blocks away from Demuth's home on King Street.

O'Keeffe's Skyscraper Silhouette

O'Keeffe similarly transformed specific buildings into national icons through her paintings, although the view from her residence at the Shelton Hotel in New York was remarkably different than Demuth's view of Lancaster. While grain elevators were part of daily life in Lancaster, skyscrapers were certainly a constant and growing presence in New York. Completed in 1927, *Radiator Building* was in many ways the culmination of a series of skyscraper paintings that O'Keeffe created in the 1920s (Figure 21). Having painted several skyscrapers before 1925, she exhibited nine of her skyscraper paintings at The Room in 1926, a gallery that tended to host artists outside of Stieglitz's circle. O'Keeffe and Steiglitz also moved to the twenty-eighth floor of the Shelton in 1925, one of the first residential skyscrapers in New York at the time. Surrounded by views of other skyscrapers from the top of the Shelton, this architectural subject matter formed the focus of her work during the mid-1920's, notably different in subject matter than the New Mexico landscapes that would follow. The subject of skyscrapers was a prevalent topic for many artists, architects, critics, and urban citizens during this time, and O'Keeffe's work represents her own interpretation of their role in a rapidly changing American cityscape.

O'Keeffe painted skyscrapers during a time when they figured prominently in her own life, as well as the daily life of many American citizens. Although *Radiator Building* does not directly reflect the view from the Shelton, O'Keeffe's residence inside a skyscraper certainly must have influenced her perception of its presence. Steiglitz wrote of the daily experience when living with O'Keeffe on the twenty-eighth floor, describing "the wind howls and shakes the huge steel frame- all is so quiet, except the wind, and the terrible shaking hulk of steel in which we live- it's a wonderful place."[203] Perched above a city that increasingly rose to new heights, O'Keeffe often worked from home in an atmosphere especially well suited for contemplating the skyscraper. Particularly in the 1920's, the skyscraper became equated to the conceptual image of New York, surpassing its earlier association primarily with Chicago. As scholar Nicholas Choen reflected, "Whereas Chicago had been the prewar model, urban theory after 1918 centered essentially on NYC, whose skyscrapers soon surpassed Chicago's in many ways."[204] During this time, as scholar Elizabeth Dean reflects, "New York becomes a city conscious of being seen, and its skyscrapers generate that self-consciousness. From their towers, the city can for the first time behold the scene in which the skyscraper is itself a part. New York becomes a city looking at itself."[205] O'Keeffe reflexively participated in this process as she looked at other towers from the tower of the Shelton, and her skyscraper paintings arguably shaped as well as reflected these self-conscious urban identities as they formed through a series of images.

Clearly impacted by the increasing presence of skyscrapers in many ways, O'Keefe painted approximately thirty paintings of the subject in just four years. In 1925, the year that O'Keefe and Stieglitz moved into the Shelton Hotel, forty-five new skyscrapers were constructed in New York, the most of any year to that date. Her devotion to this subject matter seems logical in the context of this massive construction boom, yet her skyscraper paintings were bold in the sense that it was a rare subject for women to paint at the time. Stieglitz notoriously "did not support her new venture" in painting skyscrapers, and many critics suggested that a woman might be better suited to depicting flowers instead.[206] O'Keefe's stylistic approach was as bold as her choice of subject matter, incorporating photographic qualities, abstracted forms and the crisp lines of Precisionism in a blend of styles that was uniquely her own. She depicted many of the skyscrapers at night, silhouetting their looming forms against a combination of artificial streetlights and natural moonlight. Earlier paintings such as *City Night* (1926) rendered the skyscrapers in solid, simplified forms, as a canyon of black and white buildings looming over the canyon of a street. The painting's low angle composition somewhat recreates the pedestrian experience of looking up at these towering buildings, lit by the moon or perhaps a streetlight in the distance in O'Keefe's characteristic lens flare technique, a quality she adapted from photography. This low-angle composition is present in many of her skyscraper paintings, including *New York Street with Moon* (1925; Figure 22). In this painting, the low vantage point emphasizes the extreme height of skyscrapers seen from ground level, and the curvature of the streetlight interrupts the sheer verticality of the building itself. The painting is strongly reminiscent of Erich Mendelsohn's photograph of the Shelton Hotel (Figure 9) that was printed in *Amerika* just one year later, depicting O'Keefe's own residence in a remarkably similar composition.

Radiator Building also features the skyscraper from a distinctly low vantage point, closer to the ground. Depicted at a distance far enough away to feature the whole building, the American Radiator Building is seen from what is perhaps a privileged pedestrian viewpoint. Unobstructed by the clutter of daily urban life and hovering perhaps a few feet in the air above ground level, *Radiator Building* imagines the skyscraper with a purity of uninterrupted atmosphere that is assisted by a shroud of night. While the vantage point is edited to provide an ideal view of the building, O'Keeffe's approach to the building itself is full of precise architectural representation. Straight lines and edges compose a grid of windows and massing, providing an image of the American Radiator Building that resembles a portrait of corners, edges and lines. Angles of light cut through the composition at diagonal lines reminiscent of *My Egypt*, and the lack of people on the street similarly echoes Demuth's precisionist approach to architectural depiction without humans.

O'Keeffe's choice to depict the building at night further abstracts the skyscraper into a silhouette of geometric form and massing. Art historian Vivien Fryds asserts that this nighttime depiction reduced the building to a two-dimensional object, stating, "The darkness imposed by night masks the surface features of the buildings, eliminating the facades and windows that grant them function and identity."[207] Yet blackness was a fundamental aspect of the American Radiator Building, and one of its most controversial features. Designed by architect Raymond Hood in 1924, the American Radiator Building was inspired in part by Eliel Saarinen's submission to the Chicago Tribune competition in 1922. Although Hood won the competition and built the Chicago Tribune Tower to his own Gothic-inspired design specifications, his use of stepped features in the tower of the American Radiator Building was clearly inspired by Saarinen's previous design, which placed second in the competition. Hood's own twist on the building, however, is perhaps most evident in the use of black color, coating nearly the entire surface of the American Radiator Building, which clearly distinguished itself form the surrounding skyscrapers.

As a black building rimmed with gold, the American Radiator Building itself became a form of architectural billboard, advertising the company that built it as well as providing a surface for light projections at night. Hood himself seems to have coined the phrase 'architecture of the night,' which is clearly suited to his use of dark and light qualities to give shape to the dark, artificially-lit experience of a city lit at night. By depicting this skyscraper at night rather than in daylight, O'Keeffe simultaneously embraced its black surface color and subsumed it into the night itself. The darkness of night becomes a reference to the building's unique color qualities, yet also hides it in the plain sight of a universally black nighttime. Punctured only by the crisp lines of rectangular windows, the black building takes shape only as negative space surrounding the white lights of windows. Illuminating the building through its characteristic nightly projections, O'Keeffe's painting points to the paradoxical nature of a black building at night, turned white by its illumination from within and all that projects onto it.

Although O'Keeffe identifies the building in the painting's title, her artistic approach to the skyscraper silhouettes it into abstraction. As a sequence of dark shapes and light sources, O'Keeffe's depiction of the Radiator building is also an homage to the presence of skyscrapers in the city overall. Demuth's depiction of a grain elevator in *My Egypt* similarly expands the building beyond its specific location and meaning, monumentalizing its intersecting geometric shapes and light sources. O'Keeffe and Demuth uses titles for these architectural subjects in opposite ways, yet their paintings similarly tow the line between representing the buildings as both highly specific places and nationally universal experiences.

Demystifying Egypt

The title of *My Egypt* extends far beyond the local grain elevator depicted in the painting, also reflecting the national and international phenomenon of 'Egyptomania' that occurred in the 1920s. Following the discovery of King Tut's tomb in 1922, a cultural fascination with all things 'Egypt' swept the nation. Egyptian-inspired styles appeared in great numbers in popular culture and artworks, and "the craze of 'Egyptomania' swept across Europe and America."[208] In architecture, the Art Deco style assimilated some Egyptian motifs into its approach to ornamentation. While the actual accuracy of Egyptian replicas varied, the widespread presence of Egyptian motifs in American culture was undeniable. *My Egypt* operates within this context, appearing in 1927 at the peak of this cultural fascination. The reference to Egypt would have been familiar territory for many viewers, instantly evoking the popular images of pyramids, pharaohs and mummies that were seen everywhere during this time. It thus serves in part as a comparative painting without actually depicting two different sites, juxtaposing the visual representation of the grain elevator with the direct titular reference to Egyptian architecture.

Demuth was certainly not the only one to compare American grain elevators to Egyptian pyramids during the 1920s and 1930s. Beyond the cultural associations that Egyptomania may have evoked at the time, many international architects found stylistic similarities between Egyptian pyramids and American grain elevators. While these two kinds of buildings share little in their overall massing and materials, comparisons between grain elevators and pyramids were relatively common at this time. The Bauhaus architect Walter Gropius, who was instrumental in circulating images of Buffalo's grain elevators through Europe in his *Jahrbuch des Deustchen Werkbundes*, wrote, "The compelling monumentality of the grain elevators...can almost bear comparison with the work of the ancient Egyptians in their overwhelming monumental power."[209] A few years later in 1927, art historian William Worringer reproduced one of Le Corbusier's grain elevator photos in the influential text *Egyptian Art (Agyptische Kunst)*, placing it side by side with a drawing of an ancient Egyptian temple, the Egyptian Gate Building of the Temple of the Dead of King Sahu-Ra.[210] Of course, both of these comparisons have already appeared in Banham's *A Concrete Atlantis*, where he himself could not resist admitting that the elevators, "do have an almost Egyptian monumentality."[211]

Banham identifies a quality that emerges in many of these architects' references to Egypt: monumentality. Although significantly different in their overall form and function, both grain elevators and pyramids evoke a compelling sense of monumentality for these architects. Demuth artistically emphasized both the hulking mass and the geometric attributes of their form in *My Egypt* where, as Haskell observes, "the commanding presence" of the grain elevator "monumentally dominates the composition like a hieratic icon."[212] Their towering forms, pure geometric shapes- the cylinder and the pyramid, and perhaps even their aura of mystery in concealing their inner function have likely contributed to the frequent comparison of these structures.

Despite his resistance to photography, Demuth was clearly influenced by the photographs of Buffalo's grain elevators that he had seen in European publications. As we have seen, photographs of Buffalo's Dakota, Great Eastern and Washburn Crosby elevators initially appeared in Walter Gropius' influential journal, *Jahrbuch des Deustchen Werkbundes*, in 1913, and were reproduced in several other publications throughout the 1920s. Interested far more in the overall form and massing of these structures than the complex mechanical operations housed inside them, Bauhaus architects utilized these images to articulate their own design values. Emphasizing the hulking form and pure geometric shapes of the silos, Gropius marveled at "Their monumental originality...which seems to lie in the fact that American builders have retained a natural feeling for large compact forms fresh and intact."[213] Through these images and treatises, Buffalo's grain elevators henceforth became one of the foremost American contributions to the global discipline of design. Viewed and circulated by Bauhaus architects like Gropius and Le Corbusier, images of the grain elevators continued to influence multiple generations of architects and historians on both sides of the Atlantic, a process both traced and amplified by Banham's scholarship in *A Concrete Atlantis.*

These visual representations were not viewed exclusively by architects, however, and may have influenced a far greater audience than many have initially addressed. Demuth, for instance, was familiar with the journal *L'Esprit Nouveau*, edited by Le Corbusier and Ozenfant. Writing to Steiglitz in 1921, Demuth grouped together "all the French painters, the great ones" with "the men interested in the two magazines-'L'Amour de l'Art and L'Esprit Nouveau.' A self-proclaimed admirer of these magazines, Demuth spoke of the "thrill" it was "to hear what they think of us [American modernists]."[214] Haskell has confirmed Demuth's interest in *L'Esprit Nouveau*, stating that he "felt a great affinity for its Purist images, with which he was well-versed."[215] In 1920, Corbusier published his "Three Reminders to Architects" in the first issue of *L'Esprit Nouveau*, marveling at the grain elevators in his 'first reminder' in a manner that would eventually make its way into *Towards a New Architecture* (1927). In *L'Esprit Nouveau,* Le Corbusier further amplified Gropius' sentiment, envisioning the grain elevators as "the magnificent first fruits of the new age," which would usher in a new American style that would "overwhelm...our [European] expiring architecture."[216] The text was accompanied by nine photographs of grain elevators, four of which were reprinted from Gropius' *Jahrbuch des Deustchen Werkbundes*. Buffalo's Dakota elevator and Great Eastern elevator were presented alongside examples from Canada and Argentina, and these images made an indelible impact on modern architects and artists for generations to come.

Demuth, thoroughly familiar with *L'Esprit Nouveau* by at least 1921, would almost certainly have seen these images. A 1921 edition of *The Dial*, which Demuth also specifically referenced in the same letter to Steiglitz, marveled at the French fascination for "essentially American products." *The Dial's* book review described this phenomenon, stating "*L'Esprit Nouveau* reproduces the photographs of some super-solid American silos and grain elevators."[217] Further sparking reader curiosity in *L'Esprit Nouveau*, *The Dial* asserts "*L'Esprit Nouveau* is worth having for the sake of illustrations."[218] Demuth's letter to Steiglitz confirms he was familiar with both this review in *The Dial* and *L'Esprit Nouveau* itself, indicating that he had been exposed to these images of Buffalo's grain elevators. Corn has come to the same conclusion, stating that Demuth was "surely aware that many European architects lauded the functionalist beauty of the American granary."[219] The reappearance of these images in the first English edition of *Towards a New Architecture* in 1927, the same year Demuth painted *My Egypt,* further solidifies this connection between these European modernist photographs and Demuth's own artistic interpretation of this architectural subject matter.

Le Corbusier himself compared Buffalo's grain elevators with the Egyptian pyramids in *Towards a New Architecture*. Including nine photographs of grain elevators within the first few pages of the "Three Reminders to Architects" section of the book, he pointed to these structures as emblems of a classical sensibility. Celebrating their use of primary forms and their geometric, calculated sensibilities, Le Corbusier canonized American grain elevators in this publication as "the magnificent first fruits of a new age."[220] Using images borrowed from Gropius' *Jahrbuch des Deutschen Werkbundes*, Corbusier's inclusion of the grain elevators in this context assured these often ignored industrial structures a place in canonical works to come. Banham has interpreted Corbusier's treatment of the grain elevators as if he viewed them as "the guarantors not only of the truth of architecture, but the Laws of the Universe as well."[221] Le Corbusier indeed marveled at their pure form and massing, which he viewed as "simply guided by the results of calculation" rather than an "architectural idea."[222]

Yet Corbusier, as other scholars have shown, was in fact substantially confused about these elevators, which any study will demonstrate that these calculations were far from 'simple.' Elevator locations and names were frequently mislabeled in his publications, and he was also unable to distinguish a loose marine leg from a fixed one. Furthermore, all of his images referenced a more intermediate stage of elevator design dating back to the 1910's and even earlier, neglecting to include the massive, more modern grain elevators such as the Superior or Concrete Central, which were completed by the time of *Towards a New Architecture*'s publication. These missed opportunities and misunderstandings likely reflect a lag time across the Atlantic, further complicated by the fact that Le Corbusier was publishing photographs he borrowed from Gropius, which were already nearly fifteen years old by 1927. These mistakes reveal, as Brown has suggested, "Le Corbusier didn't really like grain elevators: he simply found them irreplaceable as examples."[223] As examples, these images of grain elevators did have a lasting effect. The photographs themselves, as Banham reflected, "have come to represent canonical or exemplary structures, much as the Maison Carreé or Bramante's Tempietto were exemplary designs for earlier generations...*Vers un Architecture* made them the permanent canonical images of grain elevators."[224] Yet Corbusier's misinterpretations suggest that his interest in grain elevators was only as examples, not as buildings themselves. This may provide insight into this view of the grain elevators, wherein they primarily served a two-dimensional purpose that he subsequently achieved. In using the grain elevators to demonstrate his argument, Corbusier successfully canonized his views, rather than the elevators themselves, for subsequent generations.

In doing so, Corbusier used Egyptian references to solidify the monumental, iconic qualities that he saw in grain elevators as examples of pure form. Drawing on the pre-established legitimacy of Egyptian architecture and applying it to the lesser-acknowledged industrial forms of grain elevators, Corbusier created a peripheral comparison between these two building types that recognizes their mutual use of geometric forms. He wrote,

> Egyptian, Greek or Roman architecture is an architecture of prisms, cubes and cylinders, pyramids or spheres; the Pyramid, the Temple of Luxor, the Parthenon, the Coliseum, Hadrian's Villa...the engineers of today make use of the primary elements and, by coordinating them in accordance with the rules, provoke in us architectural

emotions and thus make the work of man ring in unison
with universal order.[225]

Placed in juxtaposition with several images of grain elevators, Corbusier's text does not directly reference these industrial buildings, but instead draws a comparison that emphasizes their primary forms. Using these photographs to illustrate the "architecture of prism, cubes, and cylinders," Corbusier peripherally demonstrates the similar use of geometric shapes between the elevators pictured and the pyramids referenced in the text. Corbusier evokes Egypt just once more in *Vers un Architecture*, in relation to building materials rather than architectural form. In a short phrase that he uses to refer to the timeless qualities of 'the drama of Architecture,' Corbusier describes "the Egyptian Pyramids, of granite once polished and shining like steel."[226] While referenced only in a passing phrase, Corbusier's mention of Egyptian pyramids in the context of steel evokes a meaningful comparison with the steel elevators and steel skyscrapers that dominated American cities at the time of this publication.

General circulation magazines also compared elevators and skyscrapers to Egyptian architecture, creating juxtapositions that lent the gravity of history and tradition to the modernity of new American architectural forms. As early as 1898, an article appearing in *Scientific American* entitled "The Tallest of Modern Office Buildings," published a lithograph (Figure 23) that superimposed six American buildings onto an Egyptian pyramid.[227] Shortly after the Park Row building was constructed in New York City, *Scientific American* published this article in awe of its height. In order to provide its readers with a sense of the building's gigantic proportions, the article draws a direct comparison with an Egyptian pyramid, indicating that it would be a common reference point for this audience. Addressing the image, the author writes, "The sketch is drawn strictly to scale and shows the relative height above ground level of several notable structures in this country compared with that favorite reference scale for height and bulk-the Great Pyramid of Egypt."[228] The emphasis on height is apparent, evident in the image's composition. The illustrator labeled each of these buildings by height, yet did not place them in any readily apparent order. Curiously, five out of six of the buildings illustrated are American, with the last being the Paris Wheel. Particularly at a time when Chicago was still viewed as the origin and hub of these early skyscraper forms, the choice of including four buildings from New York, one from Washington D.C., and none from Chicago is further puzzling. Moving from left to right, they do not follow any logical sequence, and are not arranged by height, geographic location or chronological order. Instead, they appear to mirror the pyramidal structure over which they are laid, with the Park Row, as the tallest building, placed closest to the apex of the Egyptian model. Arranged primarily for aesthetic impact, the Park Row building towers above the other skyscrapers, proclaiming the coveted status of tallest building.

The author is quick to point out, however, that even the Park Row building, which he calls "the tallest commercial building in the world," is still about three feet short of the top of the pyramid. Balancing this humility, the author also overlays the "comparative bulk" of Park Row and the Great Pyramid in cube form in an adjacent illustration (Figure 24). In this context, he asserts, "the ancient structure has about twenty-one times the volume and over three hundred times the weight of the modern building." Nearly as high but substantially smaller than the pyramid's bulky base, the Park Row building is presented in *Scientific American* as an achievement in modern American architectural design. According to the author, it "is a simple matter to pile story upon story" as the

Egyptian pyramid did, but it is “an altogether different problem for the architect to clothe the ‘skeleton’ with a mantle of stone and glass that shall appear diversified, yet dignified and appropriate.”[229] Placed in this context, the article asserts that while its height places it in the realm of a monumental Egyptian pyramid, its ornamental style identifies it as a worthy contribution to architectural design.

This comparison with an Egyptian pyramid lends the legitimacy of tradition to American architecture while also elevating the nation’s contribution, the skyscraper, to a higher status. Although the illustration compares these buildings with an Egyptian pyramid, the quest for height and architectural status also echoes the constant struggle between American architects and European ones. Particularly in the context of the skyscraper, which emerged as one of the nation’s first contributions to global design, comparisons like this one reveal an attempt to establish legitimacy in the face of older traditions. In both text and illustration, *Scientific American* identifies the skyscraper as the quintessential national building type. While these new American skyscrapers will never be able to compete with the age of European structures, their soaring height and monumental qualities have earned them a place, according to this article, amongst the Egyptian pyramids. The author is careful to address their inherent differences, but he also remarks: “Evidently in respect of the bulk and weight of our buildings we cannot compete with the ancients, but as the Pyramid is no longer a popular form of mausoleum, it is not likely that we shall ever attempt to.”[230] Surpassing the Renaissance and medieval traditions of Europe, this comparison with the pyramid leapfrogs over European traditions and places new American design amongst ancient Egyptian icons. While the article notes the clear differences in bulk, form and style between the American skyscraper and the Egyptian pyramid, it also sets up a clear comparison that equates one national building type with another. In this analogy, the skyscraper is to America as the pyramid is to Egypt. Over twenty years before Demuth painted a grain elevator in *My Egypt*, the pyramids were being claimed by some journals in the name of the skyscraper as an American architectural innovation.

While artists and architects frequently emphasized the mysterious, opaque qualities of these American pyramids, it is essential to note that they were not mysterious to their inhabitants. The absence of workers in many of these comparisons can also provoke a more biting comparison to Egyptian architecture and its construction history. Without windows or obvious points of entry, both the American grain elevator and the Egyptian pyramid obscure their interior plans, at least to the untrained eye. Although both of these structures may appear mysterious to casual onlookers who are curious about their hidden inner functions, another group of people may not view them with such wide-eyed curiosity. Laborers who work inside a grain elevator, for instance, may find the building much more legible, rather than mysterious. Grain scoopers may 'read' this kind of building with significantly different associations, thus complicating the predominant narrative of 'mystery' that is put forth by architects and artists, who visualize grain elevators almost always from the outside. Comparisons to Egypt also take on a different tone in this light, and require further examination of the relationship of these seemingly mythic structures to the harsh realities of their daily operations. Built by slaves, Egyptian pyramids stand as monuments not only to the extreme power of the pharaohs, but also remind us of the profoundly cruel conditions of their construction, enforced by that same power.

Although it is unlikely that Demuth intentionally evoked this comparison in the title of *My Egypt*, it may have at least been read that way by some viewers at the time. Haskell places Demuth's audience in this context, stating, "Because some viewed industry as exploitative of workers, the industry-pyramid parallel took on a double-edged social meaning, particularly on the eve of the Depression."[231] If not also during the last years of the 1920s, then this socially conscious reading of Demuth's title would have reasonably occurred in the context of the Depression, when labor reform and industrial working conditions took center stage. Yet, Demuth does not include workers anywhere in any of his industrial paintings, and this absence of laborers is prevalent throughout depictions of industrial structures by many artists and architects during this time, as we shall see in the next chapter. Some art historians attribute this human absence to stylistic concerns, suggesting "It isn't that Demuth was uninterested in the human figure...But they had no place in his industrial paintings."[232] Identifying Demuth's focus on architecture rather than human portraiture as an artistic choice rather than a social or cultural one, Fahlman states "Generally it is the structures, not those laboring inside them, that most interest the Precisionists."[233] While this may be true stylistically, it does not provide a compelling justification for the exclusion of workers in these industrial images. Aside from his industrial paintings, Demuth created numerous other artworks which do in fact feature human subjects, ranging from portraits of his friends in the Alfred Steiglitz circle of artists to his images of circus acrobats. These other works confirm that Demuth was clearly comfortable depicting humans in his artworks, as long as they did not mingle with industrial architecture.

Demuth's attention to light and the passage of time in this painting indicates another aspect of the title's Egyptian reference, recalling the notion of death evident in the tombs and mummies commonly associated with Egyptian culture. The angular shafts of light serve a compositional function in *My Egypt* and also indicate Demuth's awareness of the passage of time. One critic described Demuth's depiction of light, wherein "diagonal light-rays lance two central cylindrical towers and drive the eye to the center of the picture."[234] Haskell describes these "diagonally overlapping shafts of light," which "communicate the passage of time by suggesting the experience of different light and color conditions."[235] Strong lines crisscross the painting, filled with paler colors that indicate these angles as beams of light passing across the elevator at different times of day. Almost cinematographically, Demuth manages to depict a single structure at multiple times of day, all in a single painting. Haskell argues that this use of light in *My Egypt* "marked the culmination of Demuth's efforts to visually suggest the passage of time through shafts of light...The result is a sense not of time passing, but of emotional certainty, of a lifetime's experience of a specific place distilled down to a single vision."[236] Time is distilled and collapsed in *My Egypt*, where Demuth has provided a variety of intersecting light beams that show the elevator in several different times and conditions simultaneously, rather than individually. The effect of Demuth's method is "of a lifetime's experience of a specific place down to a single vision." This artistic achievement infuses the grain elevator in *My Egypt* with a sense of both simultaneity and individuality, of universality and specificity. Time has become both transient and permanent here, visible in the form of moving light within a still medium.

Examined with renewed vigor in the 1920s, centuries after the reign of the pharaohs, the monumentality of the pyramids served as monuments to an ancient civilization that once reigned, but is now long gone. This lends a sense of fragility to the pyramids, particularly during a time when archaeologists were exploring many of their ruins in Egypt. For the American public at this time, the impressive size and scope of these seemingly mystical buildings, was also perhaps accompanied by an acknowledgement that this, too, shall end. Serving as a monument to the pharaohs as well as to the passage of time, the Egyptian pyramids provided an excellent symbolic vehicle for contemplating the new industrial empire arising in the United States. Some may have worried that these structures, rising so quickly, would fall into ruin much like the pyramids.

In the late twentieth century, this proved to be eerily true for the grain elevators in Buffalo, at least for a few decades. Along with the many architects who have compared grain elevators to Egyptian pyramids in the 1920s, Banham also noted another aspect of this Egyptian comparison in the 1980s. Banham was particularly drawn to the decaying qualities of Buffalo's grain elevators, many of which had been emptied and left to ruin during his time in the city. He wrote in *A Concrete Atlantis*, "In abandonment and death they evoke the majesties of a departed civilization...[They appear] like an avenue of mighty tombs."[237] Similar to the Egyptian pyramids, these 'tombs' evoked for Banham a sense of a civilization long gone, amplified by the ruinous state in which he viewed them in the 1980s. Yet, even in 1927, *My Egypt* would have likely contained an element of death in the title, particularly due to the recent exhumation of King Tut's tomb and the resulting Egyptomania that it inspired. Death and monumentality were aligned in the

American imagination of Egyptian pyramids, and Demuth substantially compared those great ancient tombs with the new American giant of industry, the grain elevator.

Demuth's titular reference to Egypt was more than a simple nod to the Egyptomania of this era, however, and evoked several layers of international, national and personal meanings. As a painter who constantly strived to define and interpret 'Americanness,' the title of *My Egypt* also suggests an attempt to root this international reference to Egypt in both a national and a local search for identity. By identifying a Lancaster grain elevator as his 'Egypt,' Demuth simultaneously equated industry with American identity and asserted local ownership of the structure in calling it 'my' Egypt. Particularly in the context of Egyptomania, "equating these symbols of American industry with the pyramids" tended to "confirm industry's position at the pinnacle of American achievement."[238] Viewing industrial architecture as monumental architecture, Demuth's *My Egypt* identifies a grain elevator as the national equivalent of the great pyramids. Industrial architecture, then, was Demuth's answer to the nationalistic quest to identify a distinctively American contribution to the global scene. For Demuth, it was a grain elevator, not a skyscraper, that could be considered the grand achievement of America during the machine age.

Modern Media

As O'Keeffe and Demuth grappled with these building types as emblems of modern American architecture, the art world was in the midst of negotiating the most appropriate medium for depicting modern subjects. While painting had dominated the art world for centuries as the most valued medium, the introduction of photography in the mid-nineteenth century began to radically transform artistic styles, interpretations and subject matter. In the first few decades of the twentieth century, photography increasingly gained legitimacy as an artistic medium. With the help of movements such as the Pictorialists, led in part by O'Keeffe's partner Alfred Steiglitz, photography became increasingly viewed as not only a documentation of truth, but a medium that could be used for artistic interpretation as well. By the 1920's, photography had achieved substantial legitimacy in the art realm, and was a favored medium for depicting architectural subjects in particular.

The medium of photography was well suited to documenting and digesting the cultural impact of sites of mass-production. While painting continued to dominate many artistic circles, many precisionists, such as Charles Sheeler, used a camera rather than a paintbrush to interpret the growing presence of industrial subjects such as factories, railroads, and grain elevators. Contemporaneously, the factory-produced steel and concrete qualities of skyscrapers also served as subject matter that photographers were increasingly drawn to at this time. The camera proved to be an appropriate medium for interpreting the pedestrian visions of the urban experience. As two modern building types, architectural depictions of both grain elevators and skyscrapers tended to be expressed through photography, rather than painting. O'Keeffe and Demuth both worked in this artistic context, and therefore their choices to employ painting, rather than photography, deserve a closer look. Painting represented a far more traditional medium than photography, yet their artistic approach to these essentially modern buildings was far from conservative.

O'Keeffe's use of crisp line, geometric forms and lighting demonstrate her photographic approach to painting. Particularly when compared with Samuel Gottscho's photograph of the American Radiator Building (Figure 25), O'Keeffe's techniques clearly indicate some influences from photography. Photographed in 1924, Gottscho's image of the American Radiator Building at night was pivotal for his career as an architectural photographer. The success of the image established his relationship with architect Raymond Hood and earned him a place as a regular contributor to journals such as *Architectural Record* and *American Architect*. Gottscho's photograph emphasizes the stark blackness of the skyscraper, silhouetted at night and softened by the glowing lights within and around the building. Gottscho depicted the building from a similar vantage point as O'Keeffe's painting, photographed at a substantial distance away from the skyscraper, at Bryant Park, in order to enable a full view of its tower.

Despite their use of different media, O'Keeffe and Gottscho depicted the American Radiator Building with remarkably similar techniques. Their mutual approach to depicting the building at night, using similar angles and lighting techniques, indicates O'Keeffe's adaptation of photographic strategies into her painting. Some scholars have addressed the overlap between photography and painting in O'Keeffe's work, noting her ability to absorb and adapt techniques from one medium to the other. Woods observes that O'Keeffe "cropped and enlarged her skyscraper paintings like a photographer,"[239] and this can readily be seen in *Radiator Building*. O'Keeffe's paintings do somewhat resemble Mendelsohn's compositional approach to skyscrapers, which are depicted from a distance at ideal angles, or cropped and zoomed in for a closer look. Whereas Gottscho captured the building in the frame at a distance and from a slight angle, O'Keeffe's painting seems in comparison like a zoomed in version of that photograph. Placing the skyscraper in the center of the composition, O'Keeffe effectively cropped out the buildings around the American Radiator Building yet managed to maintain the idealized vantage point and distance that Gottscho achieved with a camera. Furthermore, as Fryds has noted, "O'Keeffe mimicked the effect of the telephoto lens to reduce the city to silhouette forms."[240] The silhouetted skyscraper in *Radiator Building* serves as an excellent example of this, where O'Keeffe skillfully employs a calculated composition of crisp lines juxtaposed with soft lighting. Where her earlier skyscraper paintings tended to emphasize the solidity of the buildings, here, as Woods has described, "the facade now seems dissolved into windows, almost completely eliminating the wall area in between."[241] Windows, spotlights and neon signs glow in the painting as if photographed with lens flare, demonstrating O'Keeffe's ability to acknowledge and adapt these photographic techniques to the realm of painting.

The photographic aspects of *Radiator Building* were not limited to a single painting, but instead characterized many of O'Keefe's skyscraper paintings. In *The Shelton with Sunspots* (1926), for instance, O'Keefe depicts the building in daylight, with sunspots painted as if created by photographic lens glare. In this partially blinding light, the building becomes an abstracted series of rectangles arranged in the center of the composition, simultaneously obscured and simplified by the extreme light. The hard edges of the Shelton are softened by these circular sunspots, where flowing lines of smoke and steam rise in an urban tangle of manmade and organic forms. Absorbing photographic effects into her painting technique, O'Keefe blurred the boundaries between these two media, challenging preconceived notions of their competitive suitability to depict urban architecture.

O'Keeffe's skyscraper paintings, like Demuth's *My Egypt*, were produced at a time when the art world was attempting to decipher the media best suited for modern subjects. Painting was often aligned with artistic traditions, whereas photography was increasingly adapted to emphasize a modern approach. Some scholars have suggested that O'Keeffe's incorporation of photographic techniques operated within this struggle, representing an active challenge to narratives that pit photography against painting. Particularly in the context of her partner Alfred Stieglitz's mission to assert photography as a modern artistic medium, O'Keeffe's use of photographic techniques may be simultaneously personal and political. While it is too one-dimensional to credit Steiglitz with this strong influence over O'Keeffe, she did directly reference him in the painting itself, as she included his name on the artificially-lit sign on the left side of the composition. Mimicking the nighttime, incandescent culture that the Radiator Building introduced along with Hood's concept of the architecture of the night, O'Keeffe paired the building with a red neon light beaming Stieglitz's name in the distance of lower Fifth Avenue. In this context, some scholars have suggested that this inclusion may be viewed as "an encoded portrait of Stieglitz's dynamic aura emanating from lower Manhattan."[242] During this encoding process, Scott asserts, "O'Keeffe drew upon Demuth's abstract poster-portraits when she created the *Radiator Building*, a true evocation of Stieglitz's spirit and his full-throated advocacy for modern art and artists."[243] Much like Demuth's attempt to modernize painting by distilling individuals into a series of abstracted juxtapositions, O'Keeffe modernized painting by incorporating photographic techniques, coupled with a direct reference to one of the medium's most celebrated champions. Fryds asserts that O'Keeffe intentionally appropriated some of Stieglitz's photographic techniques, stating "She demonstrated a mastery of photo-optics in her work, which included photographic distortions created by the camera and perfected by Steiglitz- halation, lens flare and the panoramic lens- but she did so through the brush to assert her own mastery and originality of the medium of painting."[244] Regardless of her reasoning for blurring these media, O'Keeffe's approach to photographic painting provided a new interpretation of modernity. Envisioning a contemporary city through the lens of a traditional medium, O'Keeffe depicted the quintessentially modern architectural subject of the skyscraper in a way that incorporates new artistic techniques with older ones.

Demuth's work suggests he was much more hesitant to acknowledge or incorporate photography into his process than O'Keeffe. In the struggle to assert new, modern forms of painting, Demuth relied on a precisionist style coupled with the clever incorporation of new painting materials instead. Where O'Keeffe adapted photographic techniques, Demuth generally shunned photography in his work. Many of his contemporaries, including Sheeler and other Precisionists, employed photography as a primary technological medium for depicting the technical aspects of industry, making Demuth an outsider in his choice to paint in watercolors instead. Particularly in the context of his contemporaries, "It was perhaps curious that Demuth relied on sketching rather than photography to record his subjects, especially since his father was an excellent amateur photographer whose interests in local history inspired him to document Lancaster architectural monuments."[245] Some of the practical aspects of photography may explain Demuth's avoidance of the medium. Although many technological advances had been made in photography by the 1920s, carrying and using a camera required a certain dexterity, which Demuth's health may have greatly limited. Sheeler, for instance, used an 8 x 10 view camera to take his photographs of nearby Bucks County in 1917, which would have been a relatively large and awkward device for someone of Demuth's frail condition to carry. Beyond these physical considerations, however, Demuth may have favored other media over photography for its textural qualities.

At different points in their careers, both artists chose to forego using the usual canvas or paper as the backdrop for their paintings and instead used industrially produced fiberboards such as Masonite and Beaver Board. Upon closer examination of another material that both Demuth and O'Keeffe employed in their paintings, medium and meaning are even further aligned in these artworks. Masonite, along with its predecessor Beaver Board, is a high-density fiberboard made by taking wood scraps and then using high pressure and a form of glue to reconstitute them into a flat, hard board. Although initially these fiberboard products were primarily used by contractors and construction crews, Demuth, along with O'Keeffe and a few other artists, repurposed the material as a new form of 'canvas' for his paintings. His first series of industrial paintings (1920-22) were almost exclusively painted on Beaver Board, and his last seven industrial paintings (1927-1934) were all painted on Masonite. O'Keeffe incorporated the material much less frequently, but she did use it for her Alligator Pear series, one of which Demuth owned. The innovative use of these trademarked brands of fiberboard had both practical benefits and interpretative potential for these artists, warranting closer examination of the material itself.

Fiberboard products provided the quintessential modern material for Demuth's architectural paintings, uniting medium and meaning for his artistic interpretations of industrial structures. These products began to appear on the American market in the early twentieth century, greatly impacting the emergence of new construction techniques. Initially designed with the construction industry in mind, the goal of the fiberboard industry was to manufacture wood panels with all of the benefits, and none of the defects of natural wood. Almost immediately, fiberboard proved to be an excellent use of resources. Made by repurposing pieces of wood that, thus far, had no other use, "these products used scraps, shavings and dust that would have otherwise been wasted."[246] Beaver Board was the first fiberboard product to appear, invented in 1906 by putting spruce wood pulp through industrial steam shredders, then chemically treating them and shaping them into rolls of single ply stock.[247] These initial components were then cemented together by laminating machines, creating four layers of stock rather than one. The final product was a slab of 'Beaver Board,' created from wood shavings, heat, and industrial-strength glue. Strong enough to serve as a substitute for lathe, Beaver Board could also be used as an insulatory building material. Produced in mass quantities beginning in the 1910s, Beaver Board was soon in high enough demand that the Beaver Manufacturing Company was able to open several factories in the U.S. and the U.K. Headquarters were located, fittingly, in Buffalo, where the factory pumped out approximately sixty pounds of Beaver Board a day.[248] The product became ubiquitous, used not only in domestic settings but also to build military camps during World War I, and to rebuild European cities after the war.[249] By 1920, Beaver Board had displaced about four percent of the demand for lumber, demonstrating its impact on building technology and the construction industry while also encouraging a do-it-yourself culture of home repairs.

Demuth used Beaver Board for his industrial paintings in 1920-1922, and then used Masonite or other fiberboards for all of the paintings in his final series, including *My Egypt*. Demuth was not the only artist to incorporate these materials into his work, as other members of Stieglitz's circle used mass-produced fiberboards for their paintings, including Thomas Hart Benton, John Curry, Reginald Marsh, Marsden Hartley, and Georgia O'Keeffe. O'Keeffe employed some mahogany and laminated wood panels in her paintings, including in the *Alligator Pear* series. O'Keeffe even sent Demuth a fiberboard sample in 1924, after he had already completed works on Beaver Board like *Lancaster* (1921) and *Machinery (*1920). In a letter to Steiglitz dated June 2, 1924, Demuth wrote, "Tell G'Keefe [sic] that I received the sample of board. It looks grand for working...I want all the help that materials can give for this effort."[250] In the years following this letter, Demuth switched from Beaver Board to Masonite. Aware that Hartley and O'Keeffe were also painting on Masonite, Demuth similarly utilized the material for its excellent 'paint taking qualities.' Although not originally designed with artists in mind, mass-produced fiberboard panels were soon appropriated by a few artists for their own purposes.

Fiberboard products like Beaver Board and Masonite offered several advantages over canvas for Demuth. The scarcity and expense of art supplies during WWI led many artists to experiment with alternative materials, and fiberboard panels offered an excellent solution. For Demuth in particular, fiberboard also presented many practical advantages over canvas. In his fragile condition, canvas was often difficult to stretch, and thus fiberboard presented a nearly ready-made alternative to the physical struggle that preparing a large scale canvas might present. Additionally, fiberboard panels could be cut to any size, and Demuth was occasionally even able to produce two paintings from a single panel. *Lancaster* and *Machinery*, for instance, were cut from the same Beaver Board panel. Fiberboard was sturdy, lightweight and easy to move around, but it also presented a timesaving alternative to canvas. Unlike canvas, an artist did not need to prime a fiberboard panel before painting on it. Demuth, however, did opt to prime his panels, on both sides. This added longevity to the condition of the painting, and also enabled Demuth to create a blank surface on the back of his artworks. He often placed a quote or a title on the back of his paintings, which in some cases was made possible only by priming over the Beaver Board logo and installation instructions printed on the panel.

Some fiberboards also had unique surface qualities, providing a textural element that appealed to artists. Unlike Beaver Board, the front and back of a Masonite panel presented artists with a choice of two different textures. While artists like Hartley and O'Keeffe usually used the smooth side of the panel, Demuth more often painted on the textured surface. Resembling a crosshatched screen pattern somewhat similar to canvas, the textured quality of fiberboard provided a raised, tactile surface unique to the material. Furthermore, the ruled lines of the crosshatched pattern may have been better suited for Demuth's precisionist industrial landscapes. Known to draw outlines for his subjects in graphite before painting them, the ruled lines built into the fiberboard panels would have provided a gridded guideline for his compositions.[251] Thus, the textural qualities specific to fiberboard panel brands like Beaver Board and Masonite presented physical and practical advantages to Demuth.

Taking the history of these fiberboard products into account, however, suggests that Demuth made a meaningful choice in using these materials to paint his industrial subjects. In addition to its practical benefits, fiberboard presented Demuth with an opportunity to weave the notion of industry into the very fabric of his paintings. Although he was not the only one to paint on fiberboard panels, Demuth's "preference for this modern, factory-made material seemed particularly suited to his industrial paintings."[252] Demuth made a deliberate choice to use fiberboard for his industrial series, evidenced by the fact that he continued to use canvas for oil paintings of other subjects during this period. Beyond its unique physical qualities, Demuth surely recognized that fiberboard resonated with his industrial subject matter. Using an industrially produced material to depict sites of industrial production, Demuth cleverly intertwined his medium and his message, which conservator Claire Barry has interpreted as "the growing industrial might of the United States as a metaphor for American culture."[253] Demuth's use of factory-made panels not only stylistically enhanced the modernist aesthetic inherent in these images, but also conveys his interpretation of industry as central to the American consciousness. The pervasive presence of industry is thoroughly consistent throughout all aspects of his work: stylistically, physically, and metaphorically.

The implications of Demuth's choice to employ Masonite in his last industrial series are manifold. Using an industrially produced material to paint industrial architecture provides a clever resonance that speaks to the profound and pervasive impact of industry on American daily life. Physically present in the fiberboard and stylistically enforced through its textural qualities, industry is simultaneously the product and process of painting for Demuth. In using Masonite as the support for these paintings, Demuth literally addressed industry from the ground up, using a flooring material to address the very foundation of production and consumption in both the local and national consciousness. His approach to industrial subjects becomes nearly architectural in the choice of this medium, using an industrial building material to depict industrial buildings, piece by piece. He constructs these images of industry out of construction materials, blurring the lines between artist depiction and architectural blueprints in fundamental ways. Artistic processes and architectural processes are conflated and united in images like *My Egypt*, where industrial production becomes a uniting, pervasive force in the built environment and the art world.

Demuth's use of Masonite also presented some practical challenges to portraying the painting, evoking the artist's complex relationship to photography. Completing all but one of his paintings in the industrial series on the wire side of Masonite panels, Demuth took full advantage of the unique surface that the medium provided. In addition to the symmetry that industrially produced Masonite provided to an image of an industrial site, the fiberboard also exhibited unique textural attributes that further strengthened the connection between painting and architecture. The crosshatched wire surface, when painted on in oil, lent a raised, three-dimensional quality to these paintings. This unique texture, remarkably akin to a brick wall, seems to extend the painting beyond its natural boundaries, reaching out towards the viewer in a very tactile manner. Particularly because this last industrial series painted exclusively architectural subjects, this brick-like texture further blurred the lines between architecture and architectural imagery. By employing Masonite, Demuth not only used a building material to depict a building but also evoked the very physical fabric of a building in its surface texture.

Compounding this kind of architectural specificity, Masonite's texture requires a person to view the painting on site, rather than in a visual reproduction. For instance, the content of *My Egypt* can be viewed in a photographic image of the painting, the distinctive textural qualities of the painting are lost in translation. In creating such idiosyncratic surfaces, Claire Barry asserts, "Demuth ensured that the true character and originality of his industrial oils could only be known through the direct observation of the original works of art themselves."[254] While it is difficult to know if this was intentional, Demuth's use of Masonite and oil provided the ultimate slight to photography. Not only did he shun the photographic medium during his preparatory process, but he also ensured that the physical qualities of his paintings, and the media he employed in their creation, would never be fully conveyed through photography. Even in the midst of the Machine Age, an era that fully expressed what Walter Benjamin has called the 'Age of Mechanical Reproduction,' Demuth's characteristic sense of artistic irony resisted the urge to embrace photography and hence fully convert to the religion of industry.

Aesthetic Matters

Simultaneously fascinated and troubled by the presence of industry in his city and his nation, Demuth sought ways to express his multifaceted approach to the machine age in his last industrial series. *My Egypt*, painted just before the Great Depression, still expresses some of the unabashed optimism the country experienced during this industrial boom, where the grain elevator's "concrete columns are, in terms of local antiquity, towering monuments to evolutionary continuity."[255] Envisioned as emblems of a new industrial age, the grain elevator in *My Egypt* epitomizes the optimistic potential of industry for the nation. Yet Demuth's presentation of industry is more complex than may initially appear, particularly when viewed in the context of both his earlier and later industrial paintings.

In the context of Precisionism, art critics and historians often compared Demuth's industrial artworks to Charles Sheeler's photography and paintings. Born in the same year, both resided in southeastern Pennsylvania and met while attending the Pennsylvania Academy of Fine Arts, occupying remarkably similar geographic territory at a time when many artists were traveling overseas. Beyond their similar circumstances, both of these artists depicted industrial architecture in a similar stylistic approach, which came to be known as Precisionism. Creating contemporaneous artworks that featured factories, rail yards and grain elevators during the 1920s and 1930s, the "artworks by Demuth and Sheeler are among the strongest examples of the Precisionist style."[256] Indeed, even a brief glance at *My Egypt* in comparison with one of Sheeler's best known works, *Criss-Crossed Conveyors,* reveals a similar artistic approach to the subject of American industry during the machine age (Figure 26). Taken at Ford's River Rouge Plant in 1927, the same year that Demuth produced *My Egypt*, Sheeler's *Criss-Crossed Conveyors* has long been recognized as one of the primary images to encapsulate the sleek lines and compelling presence of industry. Although they employ different artistic media, both of these images feature industrial architecture as their subject matter as a way of digesting and expressing its relationship to American identity. Fahlman compares their approaches to this subject matter, stating "Like Sheeler, Demuth's approach to industry [speaks of] the intellectual's newly discovered respect for the precise shapes, the clear logic of the factory building and the machine." Their stylistic approach to the subject bears obvious comparison, but Fahlman urges the viewer to identify a more nuanced divergence of their industrial visions. Unlike Sheeler, she argues, “with Demuth this admiration is curiously mixed with the esthete-bohemian’s disdain of industry...he was both attracted and repelled by the modern machine world.”[257]

Particularly in his earlier industrial paintings, Demuth’s simultaneous attraction and repulsion to industrial architecture is evidenced in the juxtaposition of his paintings and their titles. Artworks like *Incense of a New Church* convey a fascination for the sharp lines and precise forms of industrial architecture, but the title itself reflects Demuth’s sense of irony or skepticism, characteristic of his earlier industrial series. Art critic Henry McBride noticed Demuth’s complex approach to the subject, wherein he painted factories with a sense of gravity but labeled them with titles that lightened and complicated his artistic expressions. McBride noted, “Although he sees beauty in smokestacks, Mr. Demuth is not above laughing at them, or perhaps at us. He puts titles upon them that disturb academicians.”[258]

As one of Demuth’s most frequent reviewers during his lifetime, McBride also conveyed a similar dualistic fascination and repulsion for industrial architecture, a sentiment largely inspired by Demuth’s work itself. Reviewing *End of the Parade, Coatsville, PA* in 1920, he wrote “His towering smokestacks, relentless iron girders and violent red bricks and iron girders, in Mr. Demuth’s versions of them, seem beautiful.”[259] McBride’s own descriptions of these industrial items collide with Demuth’s presentations of the same subjects- where McBride may see ‘relentless,’ and even somehow ‘violent’ qualities in red bricks and smokestacks in reality, he identifies Demuth’s artistic depiction of these subjects as ‘beautiful.’ Several of his reviews suggest a transformation in the way McBride views industrial architecture over the course of Demuth's career, slowly evolving from a negative, even threatened conception of industry into one that may even be considered beautiful. In reviewing Demuth's artwork, McBride reveals his own conflicting visions of industry as well. McBride wrote,

> Demuth is aware of concrete, of immense, implacable walls of red brick, and of the towering smokestacks which cut more of a figure now than church steeples do- and somehow he doesn't seem to mind being of this period. Fortunate artist...He makes of it a thing that seems to glorify a subject that the rest of us have been taught to consider ugly.[260]

He was a 'fortunate artist' indeed. Demuth was evidently able to succeed in transforming the opinion of a person like McBride, who was, after viewing his work, apparently compelled to reconsider these 'ugly' industrial structures as objects of a strange beauty instead.

McBride's harsh descriptions of industrial architecture, and his positive reactions to Demuth's depictions of the subject, inspire wonder as to how many other American citizens experienced the same internal conflicts in viewing these scenes as ugly or beautiful, or perhaps even both. McBride's assertion that "the rest of us have been taught to consider [industrial scenes as] ugly," begs the question, who exactly has been teaching this, and how are 'the rest of us' learning it? Popular culture, evident in magazines like *Life*, may have provided one venue, yet even that seems to be a poor answer to this question when we consider that Sheeler's *Criss-Crossed Conveyors* appeared within its pages. By the 1920s, industry may have already saturated the national consciousness to the point where these 'lessons' in aesthetic value may have been both omnipresent and invisible, simply a part of daily life. Certainly, more research should be conducted to address this question at a broader scale, examining the ways in which 'the rest of us' may have internalized this lesson through the media of magazines, advertisements, and newspapers.

For the purposes of this dissertation, however, McBride's review exemplifies one of the key roles that artists like Demuth played in influencing the public interpretations of industrial architecture. Demuth's paintings provide an excellent example of the profound impact that a successful artwork can have on its viewers, perhaps even fundamentally changing their previous conceptions of industrial architecture, as seen in McBride's reviews. Translating the beauty of these structures to his viewers, rather than simply confirming their pollutive, noisy or chaotic qualities, works like *My Egypt* played a pivotal role in aestheticizing industrial architecture, particularly for an audience that may have already assumed it was merely a nuisance or even a violent presence in the American landscape.

In this sense, Demuth's depiction of a grain elevator in *My Egypt* may have had a direct impact on the visual legibility of these opaque structures. He did not convey any specific knowledge in terms of their actual function or architectural design, but he did use painting to convey a sense of nationalistic pride, one that identifies American architecture as a fundamentally 'industrial' contribution to the world. This demonstrates the immense impact that artworks can have in promoting architectural legibility. The grain elevator in *My Egypt* remains physically opaque, both in its concrete-clad reality and in the painting itself. Yet Demuth's paintings illuminate the role that artworks can play in American architectural historiography, by making a grain elevator conceptually transparent even when its inner functions and designs are not as legible as some architects have claimed.

Overall, architects, engineers and artists celebrated these two building types in distinctive yet overlapping ways. Grain elevators and skyscrapers came to represent uniquely American contributions to the global architectural scene during the late nineteenth and early twentieth centuries. This iconic status was both encouraged and reinforced by their appearance in artistic interpretations provided by artists like Demuth and O'Keeffe at the time. As European designers gradually took notice of these American building types through paintings, photographs and professional journals, American architects and engineers continued to develop both the form and function of the grain elevators and skyscrapers that were increasingly lauded on both sides of the Atlantic. When improved forms of steel and reinforced concrete emerged, architects, engineers, general contractors and even materials manufacturers collaborated in multiple ways to design and construct more efficient and more aesthetic versions of these two building types.

In doing so, American designers managed to erect two vastly different building types that were bound together by one captivating, mutual concept: structural transparency. Embracing the marriage of form and function in both obvious and subtle ways, these two building types embodied the architectural ideal of conceptual transparency, of structural clarity and legibility, which paved the way for twentieth century modernism. Heralded as two of the foremost American examples of 'pure form and function' by both architects and historians, grain elevators and skyscrapers exemplified this conceptual transparency, counterintuitively, in steel and concrete. Moving forward from these two inherently opaque building materials, Chapter Two will consider the role that glass played in further complicating, enhancing and developing these overlapping conceptual forms of transparency. In addition to embracing the structural transparency exemplified by the grain elevator and the skyscraper in Chapter One, Chapter Two will take a closer look at another, interrelated form of transparency: corporate transparency. As the public began to grow wary of the social, economic and environmental impact of factories at the turn of the twentieth century, industrial businesses attempted to convey corporate honesty through the plentiful use of glass in the form of a daylight factory.

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[1] "Grain Elevators Copy Skyscraper," *The Boston Globe* (Boston, MA), Aug 23, 1931.
[2] Lynda Schneekloth, *Reconsidering Concrete Atlantis: Buffalo Grain Elevators* (Buffalo, NY: University at Buffalo Urban Design Project, 2006), 16.
[3] Ibid, 13.
[4] For more on the technical functions of a grain elevator, see publications such as Reyner Banham, *A Concrete Atlantis: U.S Industrial Building and European Modern Architecture, 1900-1925* (Cambridge: MIT Press, 1986), William Brown, *American Colossus* (Cincinnati: Colossus Books, 2009) and Milo Ketchum, *The Design of Walls, Bins and Grain Elevators* (New York: Engineering News Publication Co, 1907).
[5] Francis Kowsky, "Monuments of a Vanished Prosperity" in *Reconsidering Concrete Atlantis* (Buffalo, NY: University at Buffalo Urban Design Project, 2006), 20.
[6] Thomas D. Odle, *The American Grain Trade of the Great Lakes, 1825-1873* (Ann Arbor: University of Michigan Press, 1951), 64.
[7] "Grain Elevators in Buffalo," *The Merchants' Magazine and Commercial Review 35.6* (Dec 1, 1856), 760.
[8] "The New York Central Terminal of Buffalo, NY" *Buffalo History Works,* website accessed April 23, 2016, http://www.buffalohistoryworks.com/terminal/history/history.html
[9] Examples of scholarship devoted to tracing this evolution, see William Brown, *American Colossus* (Cincinnati: Colossus Books, 2009) and Reyner Banham, *A Concrete Atlantis: U.S Industrial Building and European Modern Architecture, 1900-1925* (Cambridge: MIT Press, 1986). Thomas Leary and John Healey's scholarship on Buffalo's grain elevators conducted for the *Historic American Building Record* in 1990 is also a particularly great resource for delineating these early, intermediate, and late periods in great detail.
[10] "Building a Chicago Skyscraper," *Brick 4.5* (May 1, 1896), 321.
[11] Reyner Banham, *A Concrete Atlantis: U.S Industrial Building and European Modern Architecture, 1900-1925* (Cambridge: MIT Press, 1986), 123.

[12] *Engineering News* (August 1901), 210
[13] Banham, 118.
[14] "Fireproof Steel and Brick Grain Elevator" *Scientific American 77. 26* (Dec 25, 1897), 403.
[15] Banham, 121.
[16] "Fireproof Steel and Brick Grain Elevator," 403.
[17] Blackwell Canal v Buffalo ship canal names etc
[18] "The Great Northern Elevator" *The Railway Age 25.5* (Feb 4, 1898), 87.
[19] William J. Brown, *American Colossus: The Grain Elevator, 1843 to 1943* (Cincinnati: Colossal Books, 2009), 126.
[20] The other was the Cargill Electric Elevator, built in the same year.
[21] For more on the patent on this invention (No. 264.938), involving a dispute between Dunbar and his son, see Brown,121.
[22] This is not the Connecting Terminal elevator currently at the same location today, but rather its precedent. The original Connecting Terminal with the first loose leg exploded in 1914, when it was replaced with the current structure.
[23] See Brown, 122; Frederick Shepard "The City of Buffalo" *New England Magazine*, (April 1, 1893), 239.
[24] "The Great Northern Elevator," 403.
[25] Timothy Bohen, *Against the Grain: The History of Buffalo's First Ward* (Buffalo: Petit Printing, 2012), 26.
[26] In *A Concrete Atlantis,* Banham initially claimed that the Great Northern was originally "equipped with two loose legs," although in fact there were originally three legs. Images of the Great Northern at the time of its completion in 1897, such as Figure 7, confirm the elevator did in fact have three legs.
[27] F.C. Gordon, "The Skyscraper," *The American Architect and Building News 46* (Dec 8, 1894), 989.
[28] "Important Removal" *Roller Mill 16* (July 1897), 300.
[29] Ibid.
[30] Banham, in *A Concrete Atlantis,* writes that the Electric elevator "has the very considerable distinction of being the first elevator to be...equipped with a [true] mobile loose leg." Brown, in *American Colossus*, has also provided substantial evidence to refute Banham's inaccuracy in this matter. See Brown, pages 120-121, for more on this.
[31] Banham, 124.
[32] Ibid, 127.
[33] Brown, 128
[34] "The New Steel Elevator" *The Roller Mill* (January 1898), 362.
[35] "The Electric Elevator at Buffalo," *The Roller Mill* (December 1897), 305.
[36] Ibid.
[37] Brown, 128.
[38] Banham, 130.
[39] Mary Woods, *Beyond the Architect's Eye: Photographs and the American Built Environment* (Philadelphia: University of Pennsylvania Press, 2009), xviii.
[40] Banham, 124.
[41] Brown, 129.

[42] Brown, 130.
[43] Banham, 127.
[44] Banham, 127.
[45] Brown, 128.
[46] ibid.
[47] Mary Warner Marien, *Photography: A Cultural History* (London: Laurence King Publishing, 2006), 214.
[48] Gail Fenske, *The Skyscraper and The City: The Woolworth Building and the Making of Modern New York* (Chicago: University of Chicago Press, 2008), 210.
[49] Ibid.
[50] H.A. Caparn, "The Riddle of the Tall Building: Has the Skyscraper a Place in American Architecture?" *The Craftsman 10.4* (Jul 1, 1906), 478.
[51] Said by Donald Fraser of Holabird and Roche, in "Rebuilding the Stricken City: Views of Eminent Architects and Builders" *The Construction News 21.17* (Apr 28 1906), 318
[52] "The Great Northern Elevator at Buffalo" *The Roller Mill* (September 1897), 138.
[53] Erich Mendelsohn, "The Problem of New Architecture," *Erich Mendelsohn: Complete Works of the Architect*, (Princeton: Princeton Architectural Press, 1992), 16.
[54] Erich Mendelsohn, *Erich Mendelsohn: Letters of an Architect*, edited by Oskar Beyer (London: Abelard-Schuman, 1967), 69.
[55] Erich Mendelsohn, *Amerika: 82 Photographs* (New York: Dover, 1993), 44.
[56] Ibid, 45.
[57] Ibid, xi.
[58] Ibid, 41 and 22.
[59] Ibid, 45.
[60] Ibid, 47.
[61] Ibid, 74.
[62] Ibid, 75.
[63] Ibid.
[64] Brown, 66.
[65] Ibid.
[66] Ibid, 67.
[67] See Michael Frisch and Milton Rogovin *Portraits in Steel* (Ithaca: Cornell University Press, 1993) ; C. Zoe Smith "An Alternative View of the 30: Hines and Bourke Whites Industrial Photos" *Journalism Quarterly* (June 1, 1983), 305-311; Vicki Goldberg, *Lewis H. Hine: Children at Work* (Munich: Prestel, 1999).
[68] Woods, *From Craft to Profession*, 159.
[69] For more on the faulty advice provided by manufacturers, and their "amateurish engineering advice," see Woods, *From Craft to Profession*: *The Practice of Architecture in Nineteenth-Century America* (Berkeley: University of California Press, 1999), 158.
[70] Louis Sullivan, *Autobiography of an Idea* (London: Courier Corp, 2012), 312-313
[71] Woods, *From Craft to Profession*, 159,
[72] Ibid.
[73] Matthew Wells, *Skyscraper: Structure and Design* (London: Laurence King Publishing, 2005), 14.
[74] Sullivan, 312-313.

[75] See Michael Frisch and Milton Rogovin, *Portraits of Steel* (Ithaca: Cornell University Press, 1993) for more on the human impact this steel manufacturer made on the surrounding community.
[76] Woods, *From Craft to Profession*, 154.
[77] Ibid, 155.
[78] Dankmar Adler, "The General Contractor from the Standpoint of the Architect," *The Inland Architect 33* (June 1899), 38-39.
[79] R.P. Bolton, "The Engineer, the Architect and the General Construction Company" *Engineering Record 85* (1904), 59.
[80] Ibid.
[81] "How the James Stewart Company Handles Its Men" *The Construction News 17.14* (Apr 2 1904), 236.
[82] See pages 72-73 for more on the Armstrong plant, and 94-98 for more on Beaver Board
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[84] For a complete list of Stewart & Co's elevators in Buffalo and beyond up until 1909, see *Some Stewart Structures*.
[85] Thomas Leary and John Healy, "Buffalo Grain Elevators" *Historic American Engineering Record* (D.C.: National Park Service, 1990), 13.
[86] Ibid.
[87] *Some Stewart Structures,* 160.
[88] Ibid.
[89] Ibid.
[90] *American Builder* (June 1, 1924), 170.
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[94] Edward Baumann, "Methods of Isolated Piers" Chicago, 1873.
[95] E.C. Shankland "Steel Skeleton Construction in Chicago" *Minutes of the Institution of Civil Engineers 128* (1897), 9.
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[97] Ibid, 1138.
[98] Clare Cardinal-Pett, "Necessary Excess," *Journal of Architectural Education* 51.1 (September 1997), 47.
[99] Gilbert Herbert and Mark Donchin, *The Collaborators: Interactions in the Architectural Design Process* (New York: Routeledge, 2016), 10.
[100] "Sketch of the Work of the Late Edward Burling" *Chicago Tribune* (June 10, 1897)
[101] *Chicago: Historical, Pictorial* (Chicago: Rand McNally, 1902), 14.
[102] See "Sketch of the Work of the Late Edward Burling." Adler also admitted in his own article, "Comment on Skyscrapers," that he built elevators. This likely happened with Burling.

[103] Adler "Comment on Skyscrapers," 1139.
[104] Ibid.
[105] For an excellent study of this court case and its relationship to architectural drawings, see Clare Cardinal-Pett, "Necessary Excess," *Journal of Architectural Education* 51.1 (September 1997).
[106] Elyse Gundersen McBride, "The Changing Role of the Architect in the United States Construction Industry, 1870,1913" *Construction History 28.1* (2013), 137.
[107] Thomas Leslie, *Chicago Skyscrapers, 1871-1934* (Chicago: University of Illinois Press, 2013), 255.
[108] Adler, "Comment on Skyscrapers," 1138
[109] Woods, *From Craft to Profession: The Practice of Architecture in Nineteenth-Century America* (Berkeley: University of California Press, 1999), 160.
[110] Ibid.
[111] McBride, 137.
[112] Leslie, 255.
[113] McBride, 137.
[114] Theodore Hall, "Skyscrapers: The One Art that's Stridently American" *The Washington Post* (Washington D.C.), Nov 4, 1934, B7.
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[117] Leslie, *Chicago Skyscrapers, 1871-1934*, 255.
[118] McBride, 137.
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[120] Ibid.
[121] McBride, 125.
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[123] E. Kris and O. Kurz, *Legend, Myth and Magic in the Image of the Artist*, (New Haven: Yale University Press, 1979).
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[126] McBride, 125.
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[128] McBride, 125.
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[141] "How a Grain Elevator Operates" *Scientific American* 21.9 (Aug 28, 1869): 136; "What Happens in a Grain Elevator" *Scientific American 148.4* (April 1933), 226-227.
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[145] Ibid.
[146] Gordon, 101.
[147] Ibid.
[148] E.P. Overmire, "Modern Fireproof Grain Elevator," *The Northwestern Miller 56.21* (Nov 18 1903), 1104.
[149] Ibid, 1103.
[150] Ibid.
[151] Ibid.
[152] Ibid.
[153] Ibid.
[154] For Gropius, Banham argued, the grain elevators "have the added authority of coming from the Motherland of Industry, the American lands where Europeans had first discovered to be noble savages, unspoiled peoples who had retained those human virtues that sophisticated Europe had mislaid." *A Concrete Atlantis*, 204.
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[160] *American Builder* (June 1, 1924), 170.
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[196] Fahlman, 114.
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[200] Ibid, 137.
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[246] Richard Harris, *Building a Market* (Chicago: University of Chicago Press, 2012), 56.
[247] David Owen, *The Walls Around Us* (New York: Villard Books, 1991), 66.
[248] Shelby Weaver, "Beaver Board and Upson Board: History and Conservation of Early Wall Board," (*APT Bulletin* 28.3, 1997), 73.
[249] Ibid, 74.
[250] Letter to Alfred Steiglitz, 2 June 1924. Qtd in Kellner, 63.
[251] For more on Demuth's graphite preparatory process, see Barry, 156-158.
[252] Claire Barry, "Across the Final Surface," in *Chimneys and Towers: Charles Demuth's Late Paintings of Lancaster* (Philadelphia: University of Pennsylvania Press, 2007),161.
[253] Ibid, 149.
[254] ibid, 178.
[255] Karal Ann Marling, "My Egypt: The Irony of the American Dream," *Winterthur Portfolio* 15.1 (Spring 1980), 33.
[256] Fahlman, 96.
[257] Ibid, 102.
[258] Henry McBride, "Art News and Reviews-Important New Work on Watercolors: Remarkable Paintings by Charles Demuth" (*The New York Herald*, December 17, 1922).
[259] Ibid.
[260] Henry McBride, "Modern Art" (*The Dial* 74.2, February 1923), 218.

Figure 1. Great Northern elevator, present day.

Figure 2. Plan of bins at the Great Northern Elevator. Drawn by Donald Theurer. Reproduced in Reyner Banham, *A Concrete Atlantis*, 120.

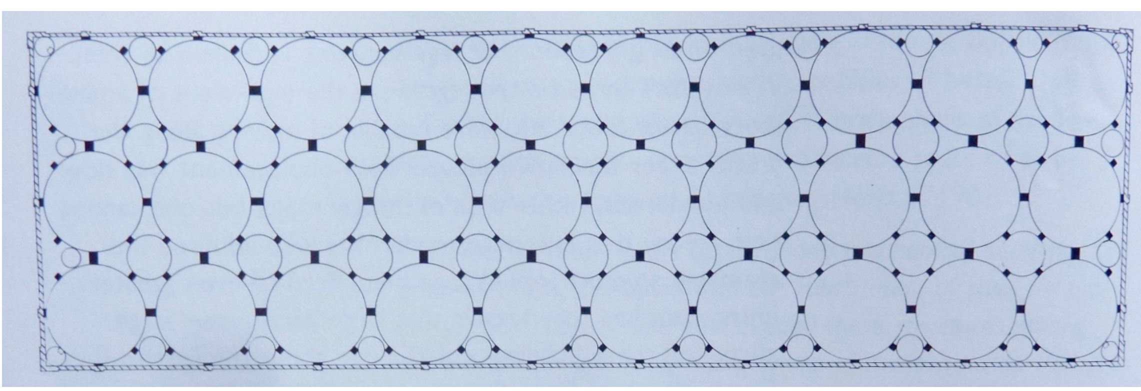


Figure 3. Electric Elevator, 1897.
From *The Industrial Empire of Niagara*, 1919. Reprinted in Banham, *A Concrete Atlantis*, 125.

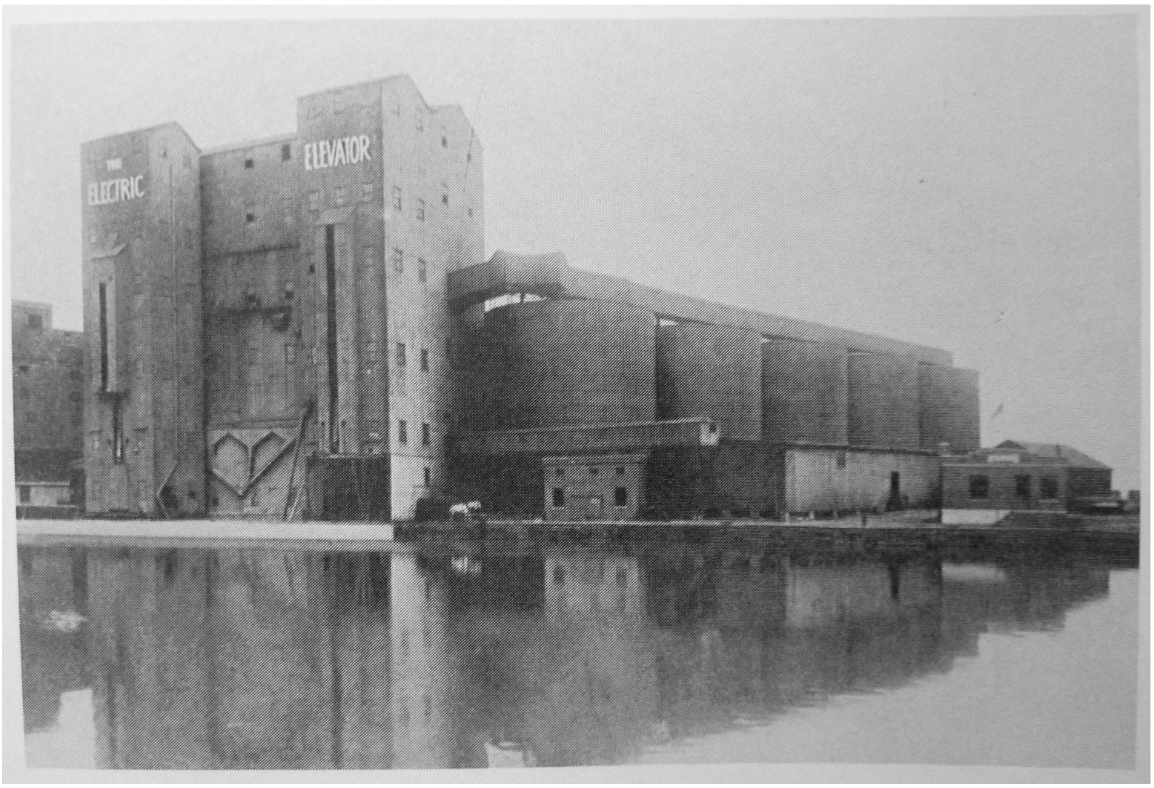


Figure 4. Construction of the Woolworth Building. April 4 and July 1, 1912.
Irving Underhill, Photographer. From *Photographic Views of the Construction of the Woolworth Building*.

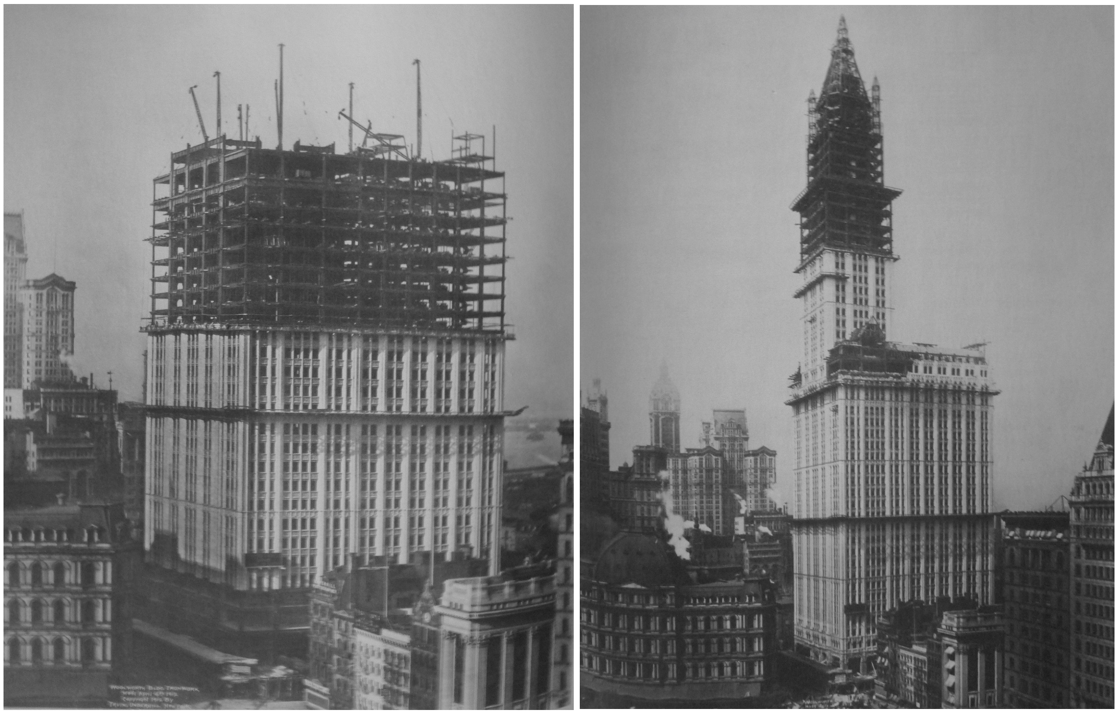


Figure 5. Construction of the Guaranty Building, 1896.
From William Birkmire, *The Planning and Construction of Tall Buildings* (New York: John Wiley and Sons, 1898).

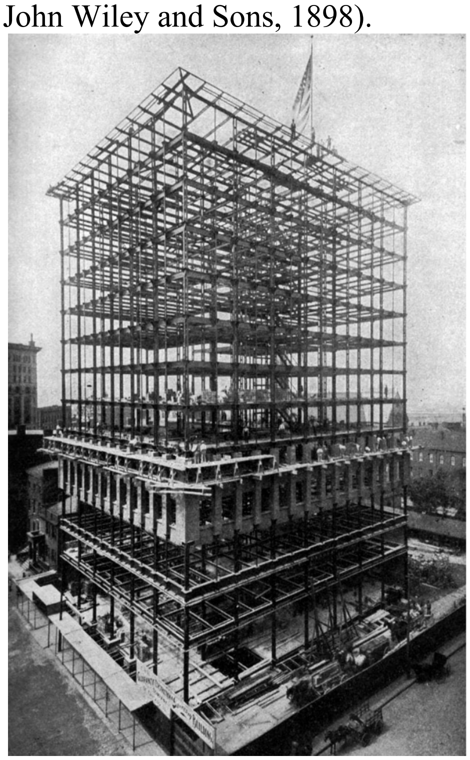


Figure 6. Great Northern elevator under construction, 1897.
From *The Roller Mill 16* (September 1897), 138.

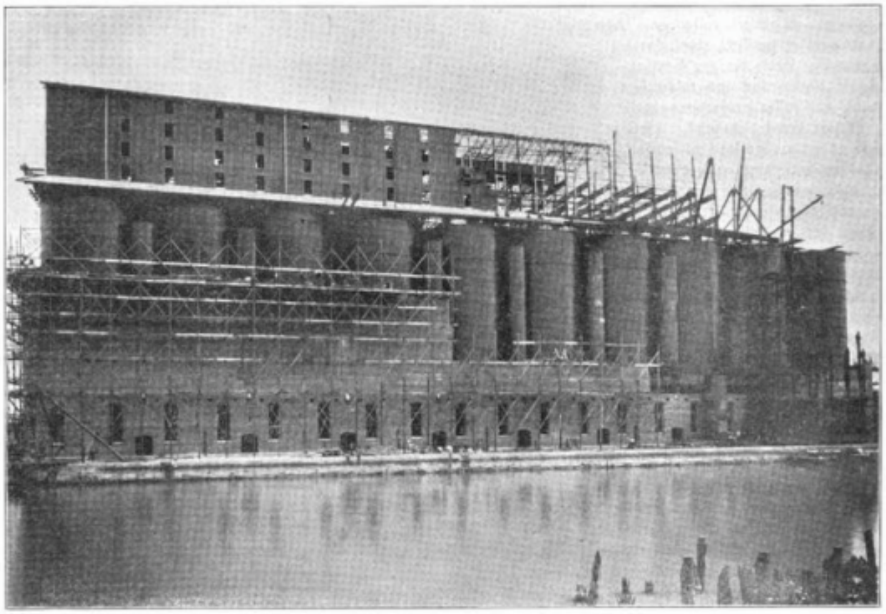
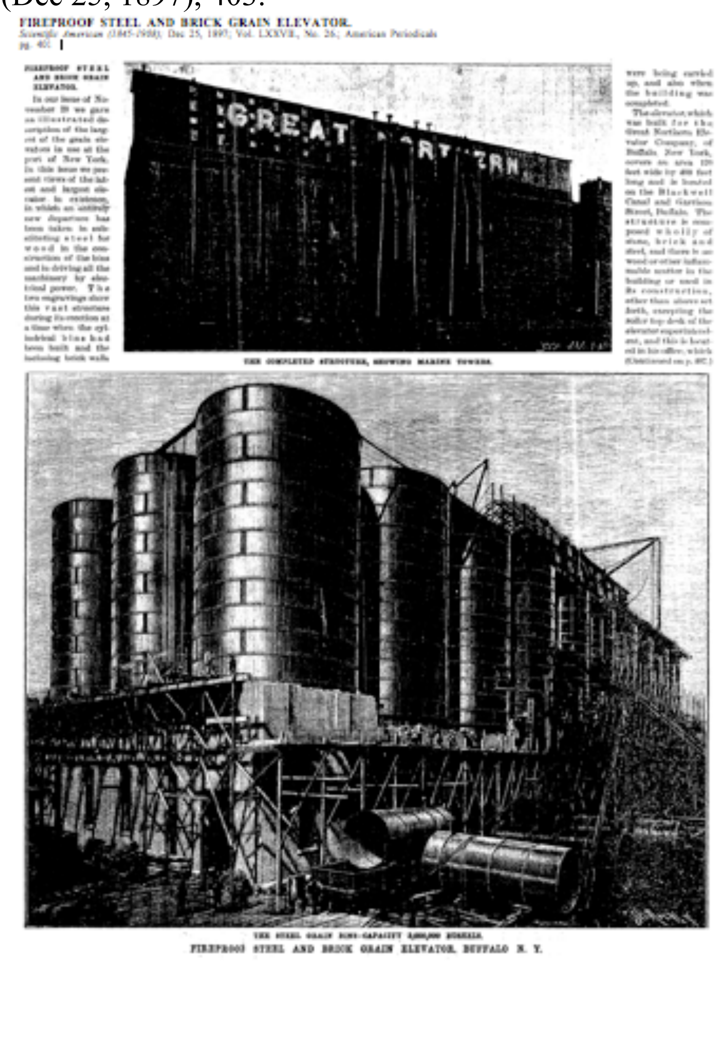


Figure 7. From "Fireproof Steel and Brick Grain Elevator," *Scientific American 77. 26* (Dec 25, 1897), 403.



FIREPROOF STEEL AND BRICK GRAIN ELEVATOR.
Scientific American (1845-1908); Dec 25, 1897; Vol. LXXVII, No. 26; American Periodicals
pg. 403

FIREPROOF STEEL AND BRICK GRAIN ELEVATOR.

In our issue of November [illegible] we gave an illustrated description of the largest of the grain elevators in use at the port of New York. In this issue we present views of the latest and largest elevator in existence, in which an entirely new departure has been taken in substituting steel for wood in the construction of the bins and in driving all the machinery by electrical power. The two engravings show this vast structure during its erection at a time when the cylindrical bins had been built and the inclosing brick walls were being carried up, and also when the building was completed.

The elevator, which was built for the Great Northern Elevator Company, of Buffalo, New York, covers an area [illegible] feet wide by [illegible] feet long and is located on the Blackwell Canal and Garrison Street, Buffalo. The structure is composed wholly of stone, brick and steel, and there is no wood or other inflammable matter in the building or used in its construction, other than above set forth, excepting the roller top desk of the elevator superintendent, and this is located in his office, which (Continued on p. [illegible].)

THE COMPLETED STRUCTURE, SHOWING MARINE TOWERS.

THE STEEL GRAIN BINS—CAPACITY [illegible] BUSHELS.

FIREPROOF STEEL AND BRICK GRAIN ELEVATOR, BUFFALO, N. Y.

Figure 7. "Grain Elevator 1." The Washburn Crosby grain elevator complex. Note the cylindrical marine tower on the right hand side of the image.
From Erich Mendelsohn, *Amerika*, 44.

Figure 8. "Shelton Hotel-Oblique Views."
From *Amerika,* 41.

Figure 9. "Grain Elevator 5."
From *Amerika*, 49.

Figure 10. "Woolworth Building."
From *Amerika*, 40.

Figure 11. "Skyscraper Under Construction."
From *Amerika*, 75.

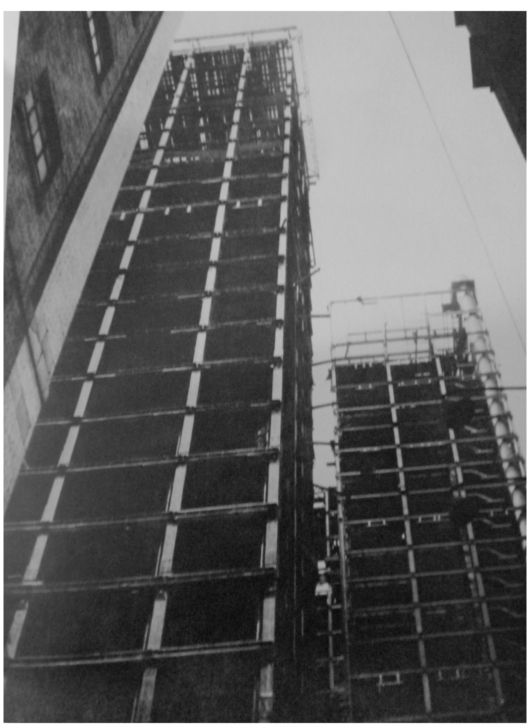


Figure 12. Superior Elevator under construction, note the circular molds for slip form construction. April 23, 1925.
Photograph commissioned by the James H. Stewart Company. Located at the Buffalo Historical Society, TR647 .S74 1925.

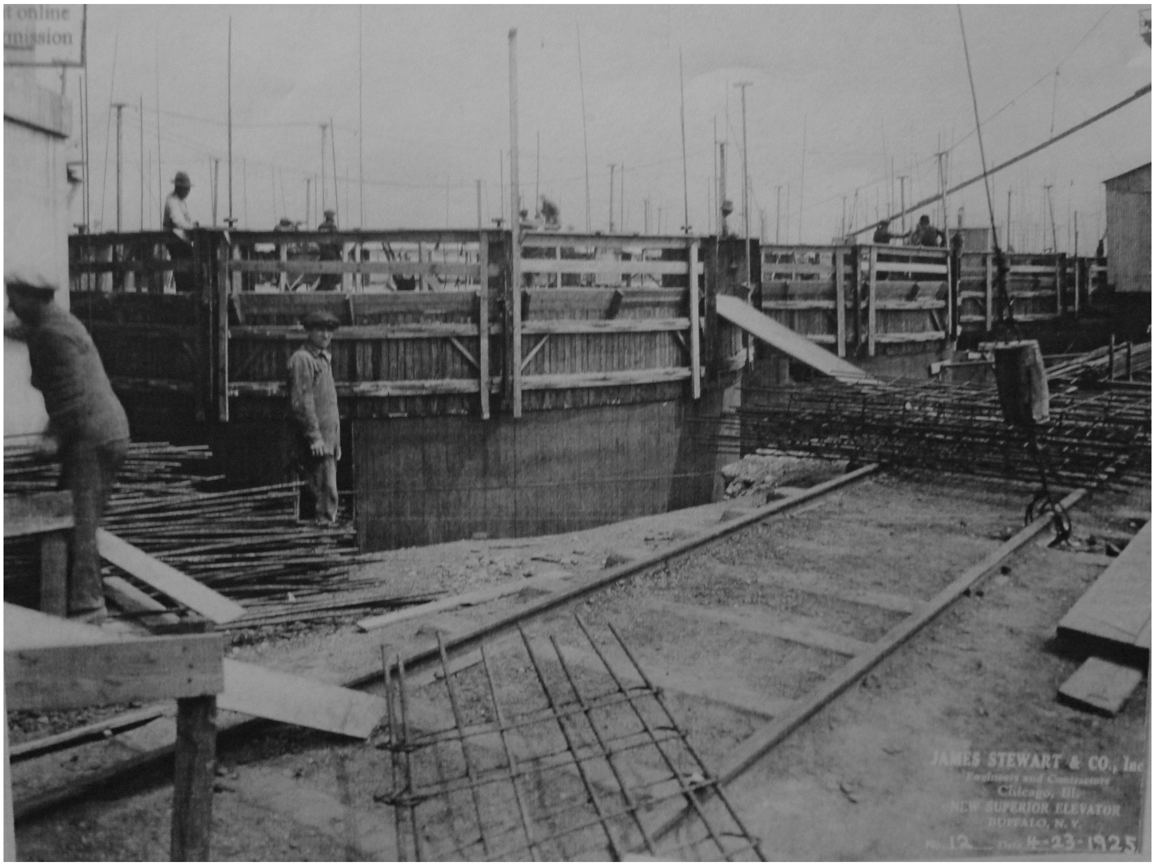


Figure 13. Superior Elevator under construction. May 21, 1925.
Photograph commissioned by the James H. Stewart Company. Located at the Buffalo Historical Society, TR647 .S74 1925.

Figure 14. Bunge y Born grain elevator, Buenos Aires, Argentina. Note the presence of the triangular pediment atop the bins.
Reproduced from Gropius, *Jahrbuch des Deutschen Werbundes,* 1913.

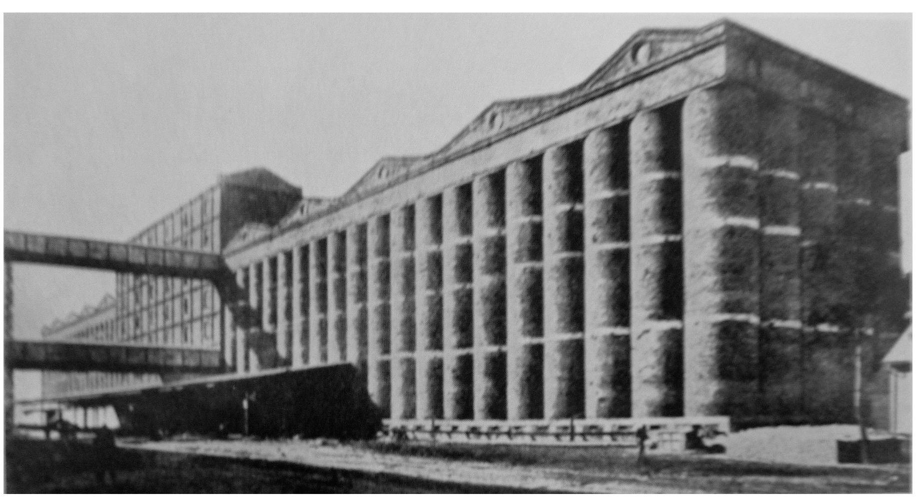


Figure 15. Bunge y Born grain elevator, Buenos Aires, Argentina. Note the absence of the triangular pediment atop the bins, edited by Ozenfant and Le Corbusier. Reproduced from Le Corbusier, *Towards a New Architecture*, 1927.

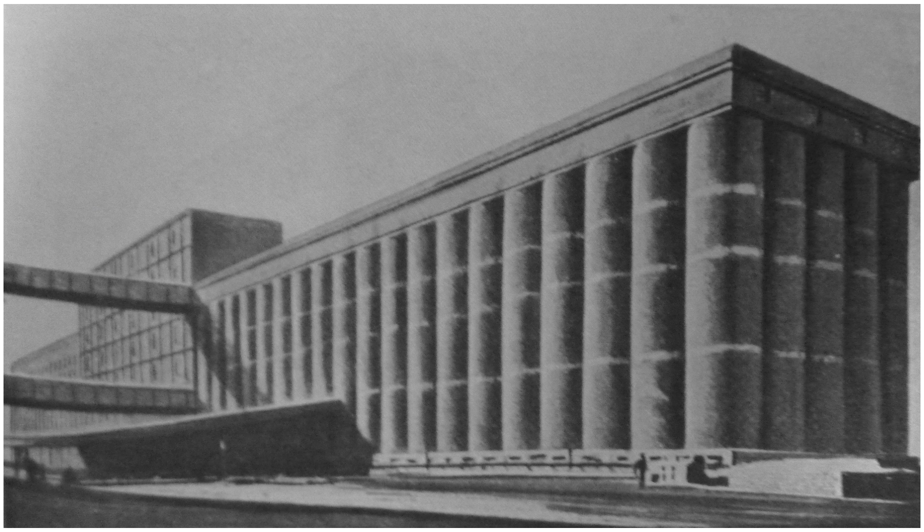


Figure 16. Demuth, Charles. *My Egypt*. 1927. Oil on fiberboard. Whitney Museum of American Art, New York.

Figure 17. Demuth, Charles. *Buildings, Lancaster.* 1930. Oil on fiberboard. Whitney Museum of American Art, NY.

Figure 18. Demuth, Charles. *Nospmas.* 1921. Oil on canvas. Muson Williams Proctors Art Institute, Utica, NY.

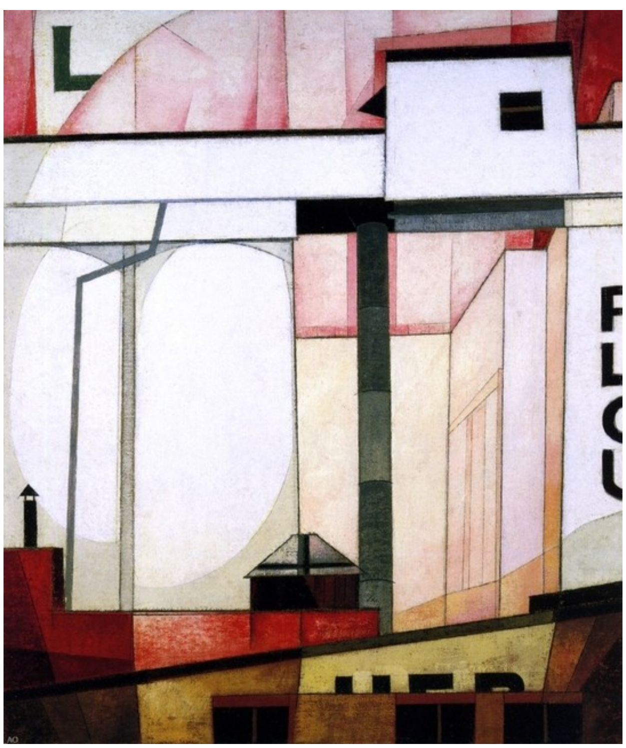
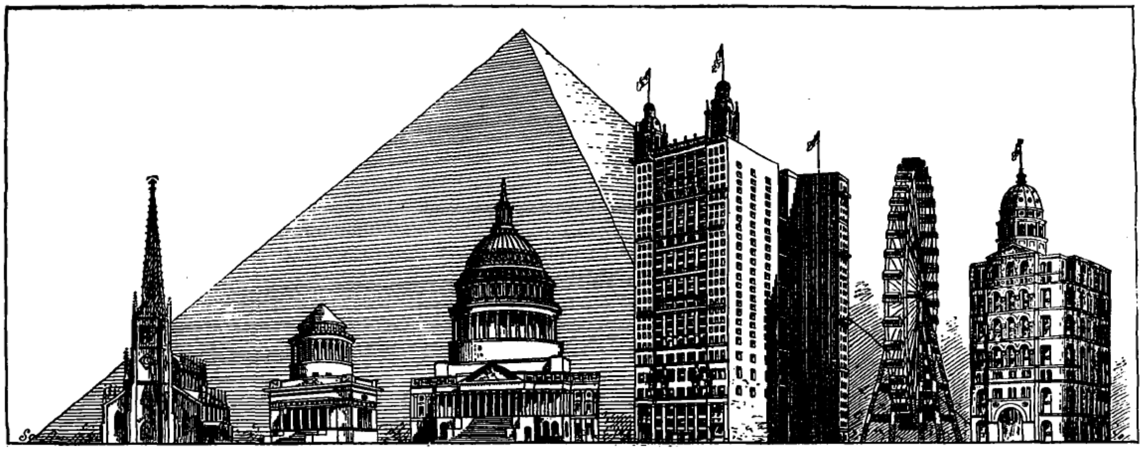


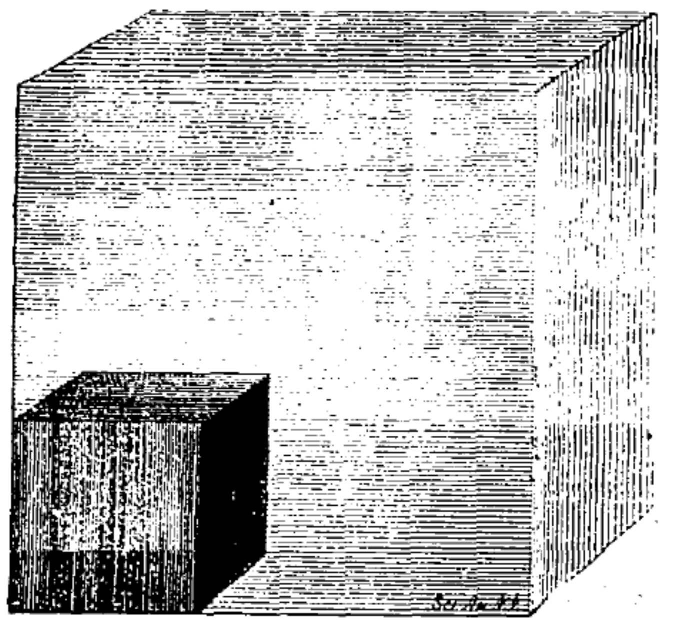
Figure 19. O'Keeffe, Georgia. *Radiator Building*. 1927. Oil on canvas. The Georgia O'Keeffe Museum, Santa Fe, New Mexico.

Figure 20. "Notable Buildings Compared with the Great Pyramid of Egypt."
From "The Tallest of Office Buildings" *Scientific American 26* (Dec 24, 1898), 409.



NOTABLE BUILDINGS COMPARED WITH THE GREAT PYRAMID OF EGYPT—HEIGHT, 450 FEET; BASE, 746 FEET.

Figure 21. "Comparative Bulk of the Park Row Building and the Great Pyramid."
From "The Tallest of Office Buildings" *Scientific American 26* (Dec 24, 1898), 409.



COMPARATIVE BULK OF PARK ROW BUILDING AND THE GREAT PYRAMID.

Figure 22. Gottscho, Samuel H. *American Radiator Building at Night*. 1926. Gottscho-Schleisner Collection, Library of Congress, Washington D.C.

Figure 23: Sheeler, Charles. *Criss-Crossed Conveyors, River Rogue Plant, Ford Motor Company*. 1927. Metropolitan Museum of Art, NY.

CHAPTER TWO

The Daylight Factory:

Corporate Transparency and Glass

As new forms of structural expression emerged in the steel grain elevators along Buffalo's waterfront, architects and engineers sought another type of conceptual transparency as they constructed daylight factories and corporate headquarters along the Niagara River. Seeking to convey corporate honesty through architectural design, business owners and architects often worked together to construct industrial buildings that would not only house large assembly lines, but also communicate benign company values to a suspicious public. The desire to garner public trust was particularly important to the growing sector of industrial food production, which marked an important shift in the way consumers purchased, made, and ate food within their own homes at the turn of the twentieth century. When factories began making foods that were previously within the control of consumers at home, many citizens expressed concerns regarding the cleanliness, employee conditions, and consistency of operations that occurred behind mysterious factory walls. In an effort to address these misgivings, industrial corporations began erecting food factories that appeared to be far more than industrial in nature. Architecture played a central role in assuaging public concerns over the industrial production of food, and factories were erected to convey public accessibility through more literal, physical forms of transparency such as glass.

Located just twenty-six miles from the city of Buffalo, the city of Niagara Falls provided the impetus for many of the industries established along the Niagara River in both cities at the turn of the twentieth century. Particularly once the hydroelectric power generated at Niagara Falls could be transmitted to Buffalo beginning in 1896, the two cities shared a number of industrial and economic sectors that further linked them together in a broader metropolitan region. Due to the availability of electricity from Niagara Falls, hundreds of new factories were built in the region at the turn of the twentieth century, resulting in a diverse, exemplary collection of industrial architecture and building types that still exists in the region today. Built in 1901, the Shredded Wheat factory in Niagara Falls exemplified the pinnacle of this early phase of daylight factory architecture, nicknamed the 'Palace of Light.'

At the Palace of Light, factory architecture was designed to convey several messages about the company, its product, and its potential benefits to consumers. The term 'building clarity' applies to the examples in this chapter in different ways than in the previous chapter. Here, clarity typically refers to the architectural quest for transparency as it manifested in material ways as well as conceptual ones. The prevalent use of glass in the Palace of Light exemplifies the type of architectural transparency that this factory embodied- as one that utilized a literally transparent material to communicate both structural legibility as well as provide plenty of light. Furthermore, the term 'clarity' appears in this chapter in more conceptual contexts, wherein architectural design was utilized to convey a series of messages put forth by their sponsoring corporations. In this type of clarity, factory architecture was used to garner public trust, attract consumers and demonstrate corporate values as being 'transparent' for all to see.

Corporate honesty, purity of product, and employee hygiene were communicated through architectural elements, giving inhabitants an idealized encounter with industrial food production. An exterior façade of white brick, classical ornamentation and clean glass assuaged nearby residents and distant customers that industrial food production could embody firm moral values rather than rampant, uncontrolled capitalism and its accompanying pollution. The interior of the factory revealed a much more innovative technological approach to industrial production, where climate control, innovative machines, and state-of-the-art bathrooms were installed in an effort to gain consumer trust through product purity and factory cleanliness. Design embodied meaning; it reinforced corporate identity, communicated product quality, and worked to gain the consumer's trust.

These values were largely a product of their historical and political context, as they emerged in factory architecture almost simultaneously with the Pure Food and Drug Act. They manifest not only in the architectural design of the Palace of Light itself, but also in the ways the structure was mediated- often in the form of visual advertising and ephemera. Place and product were heavily intertwined throughout Shredded Wheat postcards, pamphlets, and cookbooks, branding the Palace of Light factory and the natural wonder of Niagara Falls as intrinsically connected sites. By looking at the intersection of these mediated encounters with industry, we can see the many overlapping ways in which they culturally constructed the Palace's walls as much as the architect's own vision of plentiful daylight and fresh air.

This chapter focuses on the daylight factory as the central building type for this study, but it does so by drawing on a number of early examples that may complicate some definitions of this typology. While the first usage of this term is uncertain, professional journals began using the term 'daylight factory' sometime in the early 1900s. Architectural historian Betsy Bradley states that the term first appeared in the 1910s, and was used to describe "a building with a wall area filled with windows to the extent possible."[1] Architectural historian Reyner Banham, however, suggested the term should retroactively apply to buildings built ten years prior to this date. In *A Concrete Atlantis*, he stated, "Around 1900, the action and the excitement were not in iron and steel but in concrete, which was about to take off into the most spectacular stage of its development in the United States. The new men, headed by [Ernest] Ransome, were above all specialists in concrete, and their subject matter -- the Daylight factory and the grain elevator -- was to be concrete's primary province. The evidence of this is overwhelming, on the ground and in the professional literature."[2] Although the exact definition of a daylight factory can vary, it typically includes the common characteristic of having plenty of windows to let daylight into the building. In many definitions, reinforced concrete plays a critical role in the discussion of daylight factories, dividing some uses of the terms from others. Historian Lindy Biggs described the daylight factory in terms of concrete construction, where "the concrete factory did not depend on exterior walls for support and so allowed for small exterior columns, hence large areas were left free for windows."[3] While some scholars use the term 'daylight factory' to refer to industrial buildings that were specifically designed in concrete, this dissertation chapter takes a closer look at other types of examples and building materials. As a building constructed of steel and clad in brick, the Palace of Light would not fit these typical definitions of a concrete 'daylight factory,' yet in many other ways it anticipated many of its other characteristics. Furthermore, the Larkin Administration Building would not be considered a daylight factory by any of these definitions. Instead, it is included in this chapter as a comparative example that reveals many of the ways that industrial corporations branded themselves through a combination of both factory and office buildings, using architecture to promote corporate policies.

While not a daylight factory, nor technically even an industrial building at all, the Larkin Administration Building in Buffalo also exhibited some of the same corporate aims as the Palace of Light, yet this was architecturally accomplished in radically different ways. Built a few years later in 1906, the building's function as the office headquarters for the Larkin Company, an industrial corporation set within a sprawling factory complex on Buffalo's east side, lent it power as an architectural symbol for the company at large. Wright's design conveyed corporate identity and values through architectural cues, flooding the building with plenty of light from skylights above while also insulating it from the industrial neighborhood context in which it stood. As at the Palace of Light, the Larkin Administration Building embodied both company values and promotional concerns that were made evident through the physical materials of brick, steel, and above all, glass. These two buildings, now both demolished, marked an exemplary moment in the architectural struggle to reconcile industry with nature, Fordist production methods with welfare work programs, and most of all, the attempt to convey corporate honesty through structural means.

This chapter is divided into two main parts, each with subsections that address interrelated aspects pertaining to the overall theme. Part One examines three different facets related to the exterior components of the Palace of Light and the Larkin Building. Each of these subsections identifies one particular aspect of the exterior components of the buildings. In the subsection titles, the term 'façade' is meant both literally, in terms of exterior appearance, as well as figuratively, acknowledging the corporate attempts to present a carefully crafted outward facing appearance to the viewers at hand. In Part Two, the discussion turns inward, viewing the individual spaces created within the factory that were inhabited primarily by workers. Divided into two subsections, the organization of this part of the chapter reflects an awareness of the delineation that corporations made between spaces for employees to produce a product, and spaces designed for the employees themselves. Taking both the exteriors and interiors of these two buildings into account, this chapter closely examines the ways in which a large industrial business embedded its attempts to garner public trust into the architectural fabric of the factory itself.

Part One: Exterior

"Electricity will be the king of the twentieth century and Niagara Falls its eternal throne."[4]

By the turn of the twentieth century, the city of Niagara Falls was poised to dominate America's industrial sector. The development of electricity in the late nineteenth century was an important moment not only for the local region, but also for the world at large. The competitive discoveries of alternating current and direct current, by Nikola Tesla and Thomas Edison, were both developed in Buffalo and applied in Niagara Falls. The quest to harness the natural power of Niagara for industrial means was a controversial one, raising conservation concerns by the Free Niagara movement, led by Frederick Law Olmsted, which eventually led to the establishment of the nation's first state park. Eventually, a compromise was made and the Niagara Falls Power Company was able to use a limited amount of water from above the falls, captured through a series of ingenious turbines, and generate enough energy to power everything from massive manufactories to residential street lamps in Buffalo over twenty miles away.

The Pan American Exposition, held in Buffalo in 1901, was the most prominent and public expression of this electric achievement. National and global audiences marveled at the Exposition's 240,000 electric light bulbs powered by Niagara Falls, labeling Buffalo as the 'City of Light' from then on. The worldwide gaze was aimed at the Buffalo region, which was the eighth largest city in America at the turn of the century. Eight million visitors attended the exposition and millions others watched from afar in newspapers and magazines. Onlookers were fascinated with the grand display of the Electric Tower, as well as the Exposition's many artistic exhibitions, music performances, Midway oddities and colorfully painted Spanish Renaissance style architecture. While Buffalo proved its cultural worth at the fair, Niagara Falls demonstrated its economic potential by seeking investors. Industries flocked to the area, drawn to the inexpensive electricity that could be used for manufacturing. Niagara Falls, one of the eight wonders of the world, was soon visited by more than just tourists, and the city seemed well positioned to become one of the great industrial centers of the world.

Henry Perky was one such opportunist, looking for a place to build a newer, bigger factory for a product of his own invention: Shredded Wheat.[5] Born in Ohio, Perky moved to Omaha hoping to take advantage of new opportunities on the developing frontier. After being elected to the Nebraska State Senate at just twenty-five years old, Perky lived in Omaha for over a decade before moving to Colorado in 1880 in the hopes of improving his perpetually poor health. In Denver, he served as an attorney for the Union Pacific Railroad while also working on designs for a cylindrical steel rail car, an endeavor that ultimately failed, but began his entrepreneurial career.

Perky struggled throughout his life to maintain good health, and so he continually experimented with foods to ease his weak condition. In 1892, he invented a machine that created the whole-wheat biscuits now known as Shredded Wheat. Although he hoped to sell his invention to food producers, he soon recognized that the biscuits were more popular than his machine. After selling his Shredded Wheat out of a horse drawn cart in

Denver, Perky eventually moved to the East Coast, first Boston and then Worcester, to open his own factory in 1895. He founded the Cereal Machine Company- which after a succession of names, including the Natural Food Company and the Shredded Wheat Company, became Nabisco- and produced Shredded Wheat in various forms, the first product of its kind to appear on the national food market. The company employed more than 240 workers within five years, and Perky was ready to expand when Niagara Falls began to actively seek new businesses.[6]

Niagara Falls was an ideal location for Perky's business. The availability of inexpensive electricity attracted many industrialists, but for Perky there was an additional benefit to the area's location: grain. By the early twentieth century, Buffalo ranked as one of the major grain distribution centers of the world, enabling Perky to purchase grain in the city as well as use locally grown wheat from the nearby Genesee Valley in his product. This provided not only plenty of wheat to make Perky's product, but also an extensive rail system with which to ship it to Niagara Falls and then back across the world. Connected by the Belt Line rail network just twenty miles south, Niagara Falls gained easy access to Buffalo's grain, which then connected to over thirty rail lines that converged in the city. Buffalo's status as a hub for both grain and shipping networks had made it a booming, cosmopolitan city with about 350,000 residents, raising the cost of land and amenities. Niagara Falls, however, was a city of only about 20,000 when it was incorporated in 1892, demonstrating great potential to utilize Buffalo's excellent grain and services while also benefitting from the electricity and opportunities in a less developed region. In Niagara Falls, Perky had room to grow, and the means to do so.

The choice to relocate to Niagara Falls was an easy one, but choosing a site to build the new factory was more difficult. It took Perky two years to identify the property he wanted to purchase, eventually settling on a 10-acre residential plot adjacent to the Niagara River, bounded by Buffalo Avenue, 4th and 6th Streets. His decision at the time was relatively bold for an industrial manufacturer, as the location he purchased was hardly an industrial area. Although it was initially assumed that he would build his factory in an eight-acre plot opposite the Niagara Power Company building, he was deterred by the presence of smoke and noise on the site. A local newspaper, the Niagara Falls Gazette, marveled at the unique choice of location, describing Perky's process as one intrinsically related to his product:

> He noticed the clouds of smoke that were constantly arising from the locomotive passing near the site, and aside from that, noticed the fumes from the plants both above and below, and he decided that that would not do, for he was a manufacturer of pure foods and could not take the chance of having them adulterated in that manner.[7]

By positioning his new factory away from Niagara Falls' growing industrial sector, Perky immediately identified his company as one that was hardly 'industrial' in the traditional sense. Setting himself apart from the typical manufacturing image of the time, Perky indicated that his product was one of purity, cleanliness and hygiene rather than of smoke and grime. This was the first step, among many, that Perky took in order to use architecture as an advertisement for his company, creating a new vision of industry that was seemingly without industrial consequences.

The residential setting of Perky's new property was instrumental in promoting his business as a wholesome endeavor. Figure 1 depicts a rare view of the factory once completed, set within close proximity to the adjacent houses in an otherwise predominantly residential neighborhood. Tree-lined streets, grass lawns and setbacks sloping towards domestic buildings hardly seemed to be affiliated with the factory Perky built in the neighborhood. Perky had chosen a site that was once the home of Hon. Peter A Porter, a Congressman whose family had established a long legacy of respect in the area. Newspapers suggest there was some local resistance to the acquisition of the Porter property, indicating the difficulty and consequences of building an industrial factory in a residential area, particularly before formal zoning was enforced. The factory's construction required demolishing many of the buildings on the Porter estate, which caused a disturbance among middle and upper class residents who were concerned about razing one of the most historic, and historically wealthy, properties in the city to build a new food factory. However, Perky did maintain one of the historic Porter structures on site, converting the central family home into an educational institute for students of nutrition. The sensitive design of his new building helped to put some residents at ease, and he used several visual cues to convince them that this factory would benefit, rather than detract from, the communal health of the neighborhood.

Building Facades

Perky worked closely with the architects to ensure that his factory would promote company values while also providing ample space and technology for the production of Shredded Wheat. The resulting building was a five-story factory perforated with expansive windows and set amongst landscaped grounds. The steel-framed factory was clad in white glazed brick, enabling the inclusion of plenty of large glass windows that gave the factory its name as the Palace of Light. Construction was completed by the reputable Norcross Brothers firm in just five months, coinciding with the opening of the Pan American Exposition in May 1901. Deemed the 'Palace of Light' soon after completion, the factory's 844 large windows were one of the building's most distinctive features, providing plenty of daylight to the assembly lines and tourist spaces, as well as stunning views of the river. The factory's primary façade, facing west towards the Niagara River, conveyed an institutional neoclassicism with an expansive horizontal emphasis, with two protruding two-story wings located at each end (Figure 2). A five-bay centrally placed four-story entrance vestibule contained a luxurious reception room and lobby, and an observation deck was located at the top, providing excellent views of the Niagara River and Falls. Inside, the factory exhibited the latest technology, boasting an early form of air conditioning, large showers for employees, and electric powered machines invented by Perky. In many ways, the Palace of Light was a stunning and somewhat early example of an American daylight factory, with certain features amplified on both the exterior and interior in order to convey a corporate identity that was simultaneously driven by naturalistic and industrial values.

Collaborating primarily with Edward A. Deeds, Perky envisioned a building that would emphasize the wholesome and healthy benefits of his product while deemphasizing the industrial methods of its production. The relationship between architect and patron was fundamental to the completion of the factory, and a closer look reveals a cloudy boundary between these two roles during the design process. Edward Deeds is often credited with the design for the Palace of Light, but research suggests that he was not the sole architect, nor even technically an architect at all. Deeds' personal history indicates he specialized in electrical engineering first and foremost, and he applied that skill to a diversity of corporate projects over his substantial career. Born in 1874 in Ohio, Deeds spent the majority of his adult life in Dayton, where he moved in 1898 after completing his bachelor's degree at Denison University. Deeds briefly enrolled at Cornell University to pursue an advanced degree in electrical engineering, but he soon withdrew due to financial strain. Upon returning to Ohio, Deeds was hired as an electrical engineer and draftsman for the Thresher Company, where he designed electric motors. The company was headquartered in the same building as National Cash Register (NCR) at the time, and this soon had a significant impact on the course of Deeds' career.

NCR hired Deeds after just one year at Thresher, and he began his work there in 1899. During this pivotal time for the company, Deeds oversaw the electrification of the NCR factories, and also built its first electric generating station. The building that housed NCR headquarters was a remarkable structure, garnering interest from many large companies across the nation and world. Known for its plentiful light, clean facilities and numerous employee-designated spaces, the building and the company were soon recognized for its beneficial corporate practices as well as its innovative design for efficient manufacturing. Many entrepreneurs and corporate leaders looked to the NCR building as a primary example of factory architecture, and several important figures visited the building in order to learn more, including Henry Perky. After visiting NCR, Perky even invited Arnold Shanklin, the general manager for the company, to give an illustrated lecture entitled 'A New Era in Factory Life' at the International Theater in Niagara Falls. Presentations on the subject were not uncommon at the time, and by the turn of the century more than 350 American companies had adopted some aspect of NCR's methods.[8] The structure also frequently appeared in trade journals such as *Brick*, *Engineering Record*, and *Factory* at the time. Many articles emphasized the enabling presence of electricity throughout the building, marking it as an essential contribution to the productivity, cleanliness and humane qualities of working in the factory. Deeds was responsible for a substantial portion of the electrification of the factory, and this soon attracted attention from Henry Perky.

Perky hired Deeds to oversee the design of his factory in Niagara Falls in 1900, and Deeds moved to the region to work on the building from 1900-1902. Deeds' work in Ohio was certainly remarkable, but Perky's persistence in luring him to Niagara Falls may also have been related to his association with NCR. In order to convince him to move to Niagara Falls, Perky reputedly promised to move one of the houses on Buffalo Avenue closer to the construction site so that Deeds and his new wife Edith could live comfortably while working on the project. Scholar Jim Holochek, a Perky biographer, suggests that Perky's interest in Deeds was at least partly rooted in his competitive nature, indicating that he may have intended to garner legitimacy for his own factory by capitalizing on Deeds' association with NCR. Perky's interest, above all else, was that "he wanted to benefit from the most noted factory of the time, and he wanted to exceed NCR's reputation."[9] Hiring Deeds, and luring him away from NCR for even a few years, may have seemed like an excellent way for Perky to compete with NCR's reputation for excellent factory design and employee treatment.

Deeds, however, was likely ill-equipped to tackle such a massive design task alone, particularly given his training as an electrical engineer rather than an architect. His exact role in the design process is unclear, especially since very little of his correspondence with Perky seems to have survived. His professional history as an electrical engineer, coupled with the historic context of Perky's interest in NCR and its reputation, suggests that Deeds was likely part of the factory planning process at a macro level where he helped Perky articulate his vision to other more-detail oriented architects. The remainder of his career, after his time with Perky was finished in 1902, further confirms Deeds' primary interest and skill sets were more closely related to electrical engineering than architectural design. After leaving Niagara Falls, Deeds returned to NCR and then quickly underwent a series of promotions until he became Vice President and then General Manager of the company at the age of twenty nine. While at NCR, he developed a professional relationship and friendship with Charles Kettering that lasted a lifetime. Together, Deeds and Kettering successfully invented, developed and eventually sold the self-starter electric engine for automobiles, which manifested in series of corporations they initiated that eventually became Delco and then General Motors. During World War I, Deeds was appointed chief of aircraft production in Washington D.C., and the Delco plant was expanded to manufacture bomber airplanes, with the help of Orville Wright. Deeds returned to NCR to serve as President of the company until 1940, and honorary chairman until his retirement in 1957.

Both before and after his time in Niagara Falls, Deeds' career history more closely resembles an electrical engineer than an architect. Yet in the small amount of scholarship that exists on the Niagara Falls Shredded Wheat factory, Deeds is almost universally hailed as the primary architect on the project. A bit more digging reveals another story, however, suggesting that Deeds was involved primarily at a visionary stage of the project and then again when specifically tasked with incorporating electricity into the structure. Deeds certainly played an integral role in the development of the factory, but the credit that he is constantly given may be a historical reflection of the figurehead role that Perky himself made Deeds out to be, in an attempt to elevate the factory's status through Deeds' association with NCR.

Designing a factory of this scale required a diverse team of specialized disciplines, and Perky correspondingly employed several different firms to ensure the completion of the project on a tight deadline. Perky hired the Worcester architecture firm of Earle and Fisher, and the choice likely reflected his familiarity with their work scattered throughout that city, where his first factory was located. The firm built mostly churches, commercial buildings, university buildings and residences, as well as the Worcester Art Museum. They did design a few industrial buildings as well, including a three-story machine manufacturing shop for the Prentice brothers (1898) and a factory for the American Optical Company (1899), both in Worcester. Stephen Earle (1839-1913) trained as an architect at MIT, and then worked in Calvert Vaux's office in New York before partnering with architect James E. Fuller before meeting Clellan Fisher. Fisher is reputed to have built a few of Worcester's mills, and he became a fellow of the AIA in 1893 and partnered with Earle in the late 1890s. The majority of the firm's work was conducted in Worcester, and much of their commissions were notably not for industrial buildings. Taking this into account, Perky's choice of architects for building such a large factory in Niagara Falls is somewhat puzzling. Earle and Fisher had modest success as an architecture firm, and most of their commissions, many of which were not industrial designs, were located in Worcester and nearby New England locations. They were not inexperienced with industrial architecture, but there certainly were other firms that specialized specifically in factory design, and many of them were located within the

Buffalo region. Perky's choice of firm may indicate it was simply convenient, as he already knew Earle and Fisher and they were familiar with his first factory in Worcester. The relative modesty of this firm, however, may also indicate a larger pattern of influence at play, wherein Perky maintained control over the design process by hiring a firm that he could be sure would not overshadow his own ideas.

Perky and Deeds likely provided a substantial amount of conceptual input on their vision for the building. Holochek described the design process as essentially under the control of Perky himself, with assistance from Deeds given his experience at NCR. Once Perky awarded the contract to Earle and Fisher, Holochek wrote, "Perky and Deeds would spend days at the elbows of Stephen Earle explaining what they would require in the new Shredded Wheat bakery building, and watch him sketch out ideas."[10] The NCR factory was certainly an influence during this planning stage, and Perky, Deeds, Earle and Fisher all traveled together to visit the factory in Dayton for inspiration. Perky's previous factory in Worcester also provided insight into what could become an improved factory in Niagara Falls. Perky brought in a variety of employees from Worcester to provide input in the planning process, attempting to improve on the lessons learned through mistakes or limitations at his previous endeavor. Engineers, inspectors and production managers each provided insight into what could be improved, with suggestions ranging from larger, uninterrupted workflow spaces to the desire for better facilities for washing hands.

Despite the input they received from other locations, the planning process seems to have been spearheaded by Perky himself, however, with some additional input provided by Deeds and the practical design groundwork provided by the architects Earle and Fisher. Holochek's description of these design sessions 'at the elbows of Earle' in the fall of 1900 suggests that Perky, and perhaps also Deeds, led the vision of the factory to come to fruition. This description is perhaps more telling of Holochek's approach to Perky rather than the reality of the situtation, which was likely far more collaborative. Narratives like this one envision a process where architects Earle and Fisher merely provided the physical blueprints for their ideas, laying down practical provisions that would enable Perky's dream to come to fruition in tangible steel and brick. Perky and Deeds would describe the ideal conditions of the factory, and the architects would put pen to paper in order to make it structurally feasible. Whether or not Holochek's description of the process is accurate, this type of narrative is not uncommon, and seems rooted in Perky-worship rather than any tangible evidence. This vision of the planning process depicts Perky and Deeds as the masterminds behind the project, describing a scenario in which the patron is the true architect of the factory.

The results of this collaboration presented a traditional façade to the public, one that relied on institutional design characteristics and ornamentation in order to convey an exterior that seemed far from industrial in nature. While many of the factory's structural elements were at the forefront of technological sophistication, its exterior promoted a more benign, neoclassical façade. White brick, marble columns and Greek cornices provided easily recognizable motifs that suggested a familiar and unthreatening environment for customers and nearby residents. At the turn of the century, Beaux-Arts style architecture and neoclassical ornamentation often conveyed a sense of refinement, tradition and trustworthiness, evidenced by its frequent use at cultural institutions such as banks, museums and schools. These were respected styles, but not bold ones. Local reviewers shared the sentiment that the building details appeared "more like those of an office building than of a factory building- it being the theory of the promoters that beauty should be sought as an end, and not second to utility, even in so commercial a field as the manufacture of an article of food."[11] The choice to cover the modern steel frame, innovative air-conditioning system, and sophisticated plumbing system with a white glazed brick and a neoclassical style of ornamentation was likely an attempt to gain the trust of the public. Particularly due to the site's location in a largely residential neighborhood, these choices conveyed the message that this new building would not be an industrial nuisance. In many ways, it was an industrial building designed to look non-industrial, bridging tradition and innovation in order to encourage a non-threatening public engagement with the growing industrial sector.

While the Palace of Light exhibited a relatively traditional exterior style, the nearby Larkin Company took greater strides to identify itself at the forefront of new architectural design in Buffalo. Built just a few years later in 1904-1906, the Larkin Company's new Administration Building embodied some highly progressive architectural ideas and conveyed a decidedly modern exterior appearance. Hiring Frank Lloyd Wright as the architect ensured that the new administration building would convey the Larkin Company's willingness to advance into the modern era. By the turn of the twentieth century, many companies had begun to build industrial complexes and commercial headquarters that served as architectural advertisements for corporate identity. As historian Roland Marchand reflected, "Corporate presidents took great pride in the size and extent of their manufacturing works as vivid testimonies to their entrepreneurial prowess...and to inspire public admiration for their paternalistic efforts to imbue industry with beauty and benevolence."[12] Several efforts reflect this approach to using architecture to send a corporate message, including not only the Palace of Light but also the National Cash Register building in Dayton (also electrified by Edward A. Deeds) and Heinz headquarters in Pittsburgh. While the Larkin Company continued in this tradition, the design they chose to represent themselves was far from traditional.

Established in 1875, the Larkin Company quickly grew from a single building operation to a massive industrial complex occupying several blocks in Buffalo's east side Hydraulics district. The Larkin Company is remembered today primarily for their soap products, but it also manufactured perfumes, furniture, and food products such as macaroni and pudding. The company's most memorable contribution, however, was not its products but its innovative methods of eliminating the traveling salesman. Viewing the merchant as an unnecessary middleman, the Larkin Company instead used mail-order catalogs and the postal service to sell directly to customers. This allowed the company to not only drive their prices down, but also incentivize further purchases by creating what they called 'premiums.' By offering a bonus gift, such as extra soap, perfume, or even furniture, the company could entice customers to order in larger quantities. Additionally, the Larkin Company also created sales programs, such as the 'Secretary's Club,' which effectively utilized their customers to act as merchants for each other, recruiting new customers for the company in exchange for more premiums and larger incentives, such as a trip to the Buffalo headquarters. Several scholars have identified the Larkin Company as the first to develop these sales methods, and the Larkin Company quickly established itself as a prominent business on the national scale.[13] By 1903, they employed thousands of people, and hired Frank Lloyd Wright to accommodate their office workers in the company's new Administration building.

At the time, awarding the commission to Wright was a bit of a gamble for the Larkin Company, as he had only begun to establish his reputation in Chicago by building mostly residential commissions near his studio in Oak Park. The Larkin Company's Secretary Darwin D. Martin and Office Manager William Heath had been inspired by Wright's new Prairie style homes, and recognized the innovative value of his work during a time when Victorian styles and European Revival designs were more prevalent. By offering Wright his first major commercial commission, the Larkin Company executives established a relationship that not only led to the now famous Administration building, but also contributed to the list of ten commissions he designed in Buffalo, many of which were homes for wealthy Larkin executives.

Wright's design for the Larkin Administration Building was bold. Once completed, the building stood as a testament to the Larkin Company's prominence, the architect's innovative spirit, and to the dignity of work itself. Although it was unfortunately demolished in the 1950's, it still appears in nearly every major textbook of modern architecture today as an example of Wright's innovative style. The five-story red brick building with steel frame construction featured vertical brick piers and solid walls, which rose from ground level in uninterrupted planes so that the building seemed to face inward, insulating itself from the street and industrial buildings located nearby. Inside, architectural historian Vincent Scully described, "the horizontal planes of the office floors are kept back from their edges, so that they seem to be woven through them."[14] Magnesite floors, sculptures and furniture absorbed sound in the tall building, which was adorned with distinctive placards throughout each floor. The 76-foot tall interior light court was one of the building's most distinctive features, illuminating all floors of the building from above rather than using windows on each floor to interrupt the solid brick walls. Technical innovations such as air conditioning, suspended toilet bowls, and built-in furniture were present throughout Wright's design, marking the building as one of the most aesthetically and technologically advanced of its time. Far from providing a mere factory for maximum efficiency, it created a beneficial environment for office workers. The prevalence of light, artistic elements and employee amenities lent significance to work rather than dehumanizing it amongst the larger processes of the company, as many industrial corporations were accused of at the time. The prominent German modernist architect Erich Mendelsohn noted these qualities when he visited the building in the 1920s, writing in a letter to his wife that it was "more suitable for a sacred purpose than an industrial institution."[15]

During the design process, the relationship between architect and patron at the Larkin Administration Building was somewhat inverted from that at the Palace of Light. Where Perky maintained artistic control over architects Earle and Fisher, John Larkin enabled Wright to carry out his own architectural vision. Of course, the creative process was interdependent in both cases, as the design of each building required a lengthy period of negotiations between the architects and their patrons. While it was John Larkin, as president and owner of the Larkin Company that technically hired Wright, it was Darwin D. Martin that served as the architect's patron in many other ways. Martin was instrumental not only in securing the commission for Wright, but also for ensuring that his vision would not be unnecessarily compromised. As Wright scholar Jack Quinan has demonstrated, "the responsibility for the new Administration Building and its architect were largely Martin's," making him effectively the patron, if not officially.[16] As a patron, Martin operated much differently than Perky, providing many levels of support in the form of obtaining Wright and enabling his ideas, and then finding additional finances to support the project.

Wright was an unlikely choice of architect for the Larkin Company administration building, much as Earle and Fisher may have initially seemed ill equipped to design the Shredded Wheat factory. Both architects were located far outside the Buffalo region, making them odd candidates for such large projects in Western New York. Earle and Fisher were based in Worcester, MA, with most of their work within close radius to that city. Similarly, most of Wright's work was located in and around Chicago, Wisconsin and Michigan at the time of the Larkin commission, although the allure of a non-local architect may have added some prestige to the project. Martin first visited Chicago to begin discussing the Larkin Administration Building in 1902, and at this time Wright was still making a name for himself. Furthermore, almost all of his commissions had been residential at that point, with the exception of his work at the firm of Adler & Sullivan. In this context, Quinan reflected, "one may well wonder how a young domestic specialist from Chicago was asked to design this major office building."[17] The answer can be seen at least in part in Martin's clear enthusiasm for Wright's work, first introduced to him by his brother William. In a 1902 letter to Darwin Martin, his brother William marveled at Wright's ability, suggesting to Darwin, "his discovery [through the Larkin Administration Building, once built] will be talked about all over this country."[18] William's enthusiasm was infectious, and Darwin Martin soon invited Wright to travel to

Buffalo at his expense in order to begin discussions with John Larkin. Thus began Martin's courtship of Wright, which eventually resulted in him obtaining not only the commission for the Larkin Administration Building but also for several houses he designed in Buffalo for Martin, his sister and her husband George Barton, and Larkin executive William Heath.

Perky never expressed this kind of enthusiasm for Earle and Fisher, although he did court Edward Deeds for a time, luring him away from NCR and to Niagara Falls. While Perky's interest in Deeds seems to have been partly invested in his reputation as well as his actual expertise in electrification, his relationship with Earle and Fisher appears to have been far more perfunctory than was the case with Martin and Wright. Although little correspondence remains between Perky and his architects, there is some evidence that hints at Perky's dissatisfaction with their work. When construction at the factory was already underway in early 1901, Perky wrote to William Henry Ford, his former colleague with whom he invented the Shredded Wheat machine, "We need a draftsman to work on our heating system. I wish you could bring your tools and remain at the Falls."[19] Ford arrived in the following weeks to assist with the heating system, which was evidently a responsibility that Perky did not entrust to the architects and other engineers working on the factory. The reasons behind Perky's invitation to Ford may never be fully known, but his relationship to Earle and Fisher seems to have been rooted in practical, and solely practical, concerns for the factory building. Perky viewed his role as patron quite differently than Martin did, dictating his own vision to the architects so that they would make it structurally feasible, rather than enabling their artistic vision to come to fruition through financial support.

Martin famously supported Wright's architectural endeavors to the bitter end, and eventually brought on his own financial ruin in order to do so. Whenever Wright would request or require more money in order to execute a new design detail, Martin would ensure that it would be financially supported. For the Larkin Administration Building, this often required that Martin request funds from John Larkin, or raise them on his behalf. Unwilling to compromise the integrity of Wright's design for the sake of cost, Martin advocated on behalf of Wright numerous times. In the end, the fact that the administration building was built much as Wright envisioned was, "a result of John Larkin's willingness to trust Darwin Martins judgment."[20] Martin, and not Larkin, functioned as the true patron for Wright's work in this sense. For his own house, Martin wrote countless checks to Wright, sometimes in the form of loans that were never repaid.[21]

Perky, on the other hand, could not be bothered to secure the funding required to ensure the factory was constructed according to his vision. Even though he was the financial patron for architects Earle and Fisher, he left the responsibility of raising the additional money required to others. Board members William Rankine and Ernest Mills, for instance, raised over two million dollars to support Perky's factory, taking out substantial loans from the Bank of Toronto. Furthermore, Perky set the nearly impossible deadline of constructing the building in just five months, most of them during the winter. Perky hired the Norcross Brothers to oversee the construction, a Worcester firm with substantial experience, who specialized in masonry construction and worked on several H.H. Richardson buildings as well as several by McKim Mead and White. Despite their expertise, the Norcross Brothers raised concern midway through the construction process that they would be unable to finish on time, largely because they would have to lay off several workers if they did not get sufficiently paid by Perky. More interested in tweaking the final designs than in raising money, Perky eventually managed to convince the Norcross Brothers to continue to operate on a $100,000 loan from themselves, which he eventually paid over five years.

Perky and Martin demonstrated two very different forms of patronage, just as the Earle and Fisher firm and Wright exemplified two forms of architect involvement. Where Perky maintained a substantial degree of control over the vision and design of his factory, Martin went to great lengths to ensure that Wright could do the same. Perky's patronage involved delegating responsibilities to various specialists that agreed to service his vision, ranging from engineers to architects to contractors. Each firm that he hired seems to have worked in order to bring his ideals to fruition in a way that was structurally sound. With no architectural training or experience, Perky managed to coordinate a team that would envision, design and construct a large factory without ever majorly compromising his ideals. Martin, however, served as a loyal patron to Wright in nearly opposite ways. He sacrificed his financial standing, risked his reputation and coordinated various executives in order to enable Wright to envision, design and construct a large office building without ever majorly compromising his architectural ideals. These inverted examples of the relationship between architects and their patrons demonstrates the complex negotiations that contribute to the construction of a building. In both examples, however, this relationship is irreplaceable, and fundamental to the building's completion. One cannot exist without the other, and both architect and patron serve in order to bring a unique vision to fruition in brick and mortar.

Both the Palace of Light and the Larkin Administration Building demonstrate the ways an industrial corporation can erect a building that appears to be anything but industrial, at least in the common perception of the word. But while the Shredded Wheat factory relied on traditional neoclassical associations to disguise its modern industrial qualities, the Larkin Administration Building used a new architectural language to communicate corporate values. Both buildings serve as architectural advertisements for their respective corporations and products, but do so through entirely different stylistic approaches. Despite these differences, these two buildings, constructed just a few years apart, demonstrate the diversity of corporate attempts to convey their values to customers. Although they did so through different means, both operated within the historic context of cultural misgivings about factories and thus attempted to soften their industrial image.

Cultivating Facades

Public concerns over the impact of industry on the nation's cities became increasingly prominent by the turn of the twentieth century, and many designs began to incorporate naturalistic elements into their architecture and surroundings as a way to counteract these misgivings. Landscaping, lighting and cleanliness were thrust into the spotlight as essential components of not only good factory design, but also corporate personality. While welfare programs involved a number of intangible, complex factors such as worker satisfaction and health, factory architecture provided a tangible way for employers to both apply and demonstrate their efforts to improve conditions. A stunning factory could provide excellent visual material for an advertisement, but well-groomed factory grounds could also suggest tangible evidence of positive employee conditions.

Expansive lawns, meandering paths, and a variety of flower gardens began to adorn factory settings across the nation at this time, attempting to uplift employee spirits and health, or at least appearing to do so. The Shredded Wheat Company, created an industrial 'park' space on company grounds as part of this movement, which was also seen at companies around the nation such as Eastman Kodak, Proctor and Gamble, NCR and Heinz. By carefully landscaping their factory sites, corporations "hoped to distinguish themselves from the operators of grimy, cheerless factories...they counted on the lawns, ornamental shrubs, and flower gardens to attract workers of a higher caliber, especially among women laborers."[22] Looking to attract both consumers and the work force, corporations pointed to their elaborately landscaped factory settings as testimony of their munificent influences on industrial society.

Trade journals aimed at an audience of employers and designers provided tangible suggestions for factory beautification tactics in an attempt to guide this process. Recommendations ranged from simple to specific, all of which aimed to improve the popular conception of corporations by improving their industrial landscape settings. Profit was consistently an underlying motive in these journals, appealing to the practical side of what was likely a readership of employers and factory owners. One journal stated, "It does not require much force or a great expenditure of money to have clean floors and windows and to furnish fresh air."[23] By focusing on these minor tweaks to factory amenities, these journals gave corporations some tangible tasks they could complete in order to physically advertise their positive influence on both employees and the general consuming public.

Industrial corporations frequently applied these landscaping solutions not only because they believed they would counteract the malevolent appearance of smoke and grime, but also because, like architecture, it was a physical element within their own control. Making a factory worker happy and healthy was a tricky enterprise, but making architectural conditions in which they theoretically *could* be happy provided a much more tangible approach. Labor historian Andrea Tone reflected, “In reformers' eyes, industrial architecture was an active agent of personal reform...architecture and design were viewed as blueprints for society as a whole, projecting an image of chaotic, urban and industrial world redeemed by manicured gardens and factory windows overlooking pristine greenery."[24] Conceiving of their factories as ‘blueprints for society as a whole,’ industrial corporations prioritized architecture and landscaping in their quest for the appearance of benevolent conditions. Without disrupting the social hierarchy carefully established between employer and worker, changes to the factory structure could promote a highly controlled message. The factory itself, along with a gently landscaped setting, came to embody corporate policy perhaps more than any other company program.

Encouraging business owners to make these small adjustments, journals provided specific suggestions for good landscaping practices, often citing exemplary corporations to illustrate the benefits of a better exterior appearance. NCR’s landscaping efforts made a favorable impression on one author, who noted their ability to not only assuage nearby residents of the benevolence of industrial sites, but also encourage better lawn practices for the adjacent neighborhood homes. Reflecting concerns over the industrial reputation, he wrote,

> Too often, the coming of a factory into a neighborhood is considered a misfortune, and has a depressing influence

> upon the value of residence property within its vicinity. This is not necessary and, with a little effort on the part of the factory people, it may be avoided. The factory may be made a center of life and influence for the entire neighborhood.[25]

Not only would a well-groomed lawn communicate the healthful, benevolent conditions of a factory, but it could also make a positive influence on the surrounding community. The key to doing so, it seemed, were shrubs. "The company in this case has set an example by beautifying its own grounds in every way possible, seeking to accomplish the desired result...by the use of such shrubs only as the people themselves may cultivate if they desire."[26] Not only shrubs, but also "the cultivation of vines, window boxes, vegetable gardens and similar things will add to the beauty and comfort of the neighborhood."[27] Suggestions like these placed significant power in the hands of landscapers. By the simple use of shrubs and window boxes, corporations believed they could craft a positive impression of industry that not only dulled the sharp edges of factory conditions, but also could potentially inspire nearby residents to improve their own lawns.

Several landscape elements were integrated into the grounds at the Palace of Light, and Perky made sure to publicize his efforts to beautify the factory setting. In April 1901, Perky invited notable landscape architect John C. Olmsted, the adopted nephew of Frederick Law Olmsted and partner in the Olmsted Brothers practice, to survey the factory grounds in preparation for new landscape design. Just one month before the factory's intended opening date in May 1901, Olmsted made his first visit to the factory under construction in Niagara Falls. Given the speed of construction on the project, which began only four months earlier in December, it is perhaps unsurprising that Perky waited until April to contact Olmsted. On this first visit, still on the cusp of the region's lengthy winters, Perky paid Olmsted fifty dollars plus travel expenses, but still "put off any formal agreement until later in the spring when the frozen ground could be worked."[28] The local newspaper immediately took note of Olmsted's visit, where he was seen "looking over the grounds owned by Mr. Perky for the purpose of beautifying them."[29]

After examining the factory grounds, Olmsted identified a number of tasks that should be completed in the spring. Many of these tasks required transforming the preexisting lawn that occupied the site, where Olmsted suggested, "the existing lawn would have to be plowed, harrowed, planted, and plowed again and temporarily seeded with five bushels of Hungarian Rye grass. Trees would be felled and others planted. The lawn and gardens would be watered by underground sprinklers and drains."[30] Each of Olmsted's indicatives was accomplished in the following months, resulting in a far more attractive landscape than the formerly desolate and wild lawn that existed prior to construction. The sweeping lawn surrounded the factory on all sides, stretching out westward in a particularly large open space peppered with flower-bordered, curved walkways for both employees and visitors to follow towards the Niagara River. Olmsted's design created a sense of connectivity between the factory building and Niagara River and Falls located nearby, with walkways, plantings and trees arranged so as to point towards the massive waterways that were nearly adjacent to the lot. Perky owned all of the land between the factory and the Niagara River, and this landscaped area became an integral component to enhancing the appearance of the factory's 'natural' setting. Olmsted arranged a series of formal plantings between the building and the road, with the Niagara River beyond, featuring flower gardens centered on larger grass plots. Small trees were scattered throughout the lawn, but no large trees or vines were located near the factory, ensuring that there would be no obstruction to the daylight that filtered into the building's numerous windows. An "expert landscape gardener" was employed to maintain the grounds, ensuring that Olmsted's specifications would be kept in good condition for many generations. The landscape design was met with much approval from local newspapers, which deemed the grounds "an ornament to the city" on numerous occasions.[31] Not only did Olmsted's design provide visual connectivity between the factory and the waterways of Niagara Falls, but also provided residents of the surrounding neighborhood with a park-like space to visit.

By inviting all the visitors, residents and employees to utilize the landscaped setting, the factory grounds became a porous space between the factory and its larger urban context. There was no fence to prevent non-employees from using the lawn, and several factory pamphlets advertised that nearby residents were welcome to enjoy the lawn, along with the "many thousands of visitors that admire it every year."[32] While it is difficult to know for certain if residents actually used the lawn as a semi-public park, Perky did make additional efforts to integrate the factory landscape into the surrounding neighborhood context. In April 1902, just one year after the factory opened, the *Niagara Falls Gazette* announced a landscape gardening contest that was sponsored and funded by Perky's company. Describing the contest, the article stated, "The Natural Food Company comes to the front once more. Not satisfied with adding greatly to the architectural beauty of the city by erecting a magnificent structure on Buffalo Avenue for the manufacture of the famous Shredded Wheat biscuits, they now come forward with a plan for the improvement of the city, especially throughout the residence sections."[33] The article provides no further details as to the exact location of the contest, although Holochek mentioned that Perky made an attempt to incentivize nearby residents to garden on their own properties, and this is perhaps what the contest hoped to achieve.[34] With prizes awarded and "competent judges to make decisions," the Natural Food Company (later the Shredded Wheat Company) reached out to the community to encourage better landscape design not only on its own grounds, but in the surrounding community as well.

While Perky used landscape design on the factory grounds to stretch towards the natural wonder of the Falls outside, Wright created a more insular environment in order to achieve a similar naturalistic effect inside the Larkin Administration Building through nearly opposite means. Rather than hiring a landscape designer, Wright integrated two primary, interconnected spaces into the design of the building itself. The axonometric drawing of the fifth and sixth floors seen in Figure 3 illustrates Wright's incorporation of naturalistic settings into the Larkin Administration Building. Accessible from the fifth floor restaurant by an open stairwell, a substantial, enclosed conservatory was located on the partial sixth floor inside the building, and was connected to an outdoor rooftop rooftop on either side of the sixth floor, where a small outdoor garden with tiled promenade was accessible to employees. The two identical rooftops were located at the east and west ends of the top floor, providing "extensive views in all directions" to employees who visited these spaces during seasonable weather.[35] Due to Buffalo's relatively short summers, Wright devoted considerably more attention to the conservatory located inside the building than he did the rooftop gardens. The rooftop gardens served as an extension of the interior conservatory spaces, connecting these small outdoor areas to a more controlled climate inside.

The sixth-floor conservatory provided a naturalistic refuge for employees that was markedly different from the surrounding urban, industrial context of the Larkin Administration Building. Arranged at the north and south ends of the sixth floor, several plants were visible from the main floor of the light court seventy-five feet below. These plants marked a conservatory, which extended towards to the north and south sides of the building. Several visitors described these conservatory spaces, where "palms, ferns, vines and other plants of suitable nature" were arranged in a seemingly wild pattern, clustered together in a scene of lush greenery.[36] Additionally, these conservatories also included "basins, a score or so feet long and well proportioned width, for aquatic plants."[37] Figure 4 depicts one of these two conservatories, illustrating the lush greenery planted underneath a glass roof that resembled a greenhouse. This image also depicts a walkway through the conservatory at gallery level, raised above the plants below. Visitors could gaze down at the plants from this observation walkway, with a view of the entire room lit by the plentiful daylight filtering in through the glass roof. This walkway also connected to the rooftop garden outside and enabled passageway through the conservatory without disturbing the plants, simultaneously creating circulation through and separation from the greenery inside the conservatory.

These interior conservatory spaces reveal Wright's attempt to create an insular, landscaped environment, which contrasted from the outdoor, expansive lawns at the Palace of Light. Although the Shredded Wheat factory was determinedly more industrial in character and function that the Larkin Administration Building, which functioned primarily as office space, their surrounding neighborhood context was nearly opposite. While the Palace of Light was situated within a relatively quiet, residential area adjacent to one of the most famous natural wonders in the world, the Larkin Administration Building was surrounded by the company's numerous industrial factories and warehouses, adjacent to noisy railroad lines. Architectural historians Mollenhoff and Hamilton briefly addressed this context, stating "From the first time Wright saw the ugly, noisy, sooty industrial site in 1902, he insisted that his design provide a pleasant, even inspiring, environment for the company's employees."[38] In response to this heavily industrialized context, Wright " sealed the structure...to keep industrial noise and dirt out. He drew filtered air from the roof level and distributed it throughout the building."[39] Wright designed the administration building in response to this environmental context, creating a fortress of filtered air and natural light within an otherwise industrial setting. The sixth-floor conservatories represent Wright's determined attempt to insulate the building from its surrounding urban context, creating a landscaped environment within the building when, unlike at the Palace of Light, one did not already exist outside its walls.

Wright's conservatory at the Larkin Administration Building also evokes a broader historical context, one that points to nineteenth-century examples of glass conservatory architecture that similarly counteracted the harmful effects of an increasingly industrial urban context. As a typology, glass conservatories, greenhouses and orangeries emerged as early as the sixteenth century, when wealthy aristocrats devised a number of ways to grow exotic plants within the confines of their estates.[40] After two centuries of horticultural advancements, material improvements and architectural experimentation, however, it was Joseph Paxton's Crystal Palace built to house London's Great Exhibition in 1851 that modernized the typology. Using newly developed, industrially-produced glass plates that could be made in clearer glass and larger sizes, coupled with newly elaborate and affordable cast iron framework to support the panes, the Crystal Palace has historically been recognized as "the first great 'modern' building...[which] heralded technological speed, engineering and management coordination, and newfound spatiality."[41] Industrial production methods enabled new structural advancements and architectural designs, where glass "was no longer defined and confined within the rectangular load-bearing from of a window, but was considered a 'climatic envelope,' a membrane that controlled the environment, encapsulated space and mediated the light."[42] Redefining glass as a 'climatic envelope,' the Crystal Palace initiated a century-long architectural quest for new ways of "constructing with light" that largely originated with the typology of the conservatory.

Over fifty years later, Wright used glass in his conservatory at the Larkin building to achieve a similar, insulating effect amidst the industrial context of the surrounding neighborhood. This, too, was aligned with one of Paxton's initial impulses, where the architect attempted to create a light-filled interior environment that was separate from the soot of the industrial city outside, even in the Hyde Park environs that surrounded the building. Historian Paul Davies confirmed that Paxton "was interested in the amelioration of the appalling industrial conditions associated with the Industrial Revolution, using his parks, greenhouses and domestic conservatories."[43] Attempting to counteract the harmful environmental effects of newly industrialized cities, conservatories provided a climate-controlled interior space that was selectively porous to the outside. Filtering in daylight while filtering out soot, noise and polluted air, the conservatory, as a building type, utilized the best of both worlds. Made possible by new technologies in the industrial production of glass, yet excluding other environmental aspects of those same industrial factories, the conservatory could serve as a world within a world, providing a seemingly pre-industrial refuge full of greenery and light that was only made possible by industry itself.

Wright's conservatories at the Larkin Administration Building continued in this architectural tradition. His design utilized glass roofs, plantings and filtered air to create a warm, naturalistic interior environment that both capitalized on and counteracted the immediate industrial surroundings outdoors. The conservatory, as both a physical space and a concept, thus provided a natural balance to the adjacent factory setting. Particularly at the turn of the twentieth century, this balance was an essential component to designing architecture in an industrial context. Amidst rampant industrialization, which brought with it substantial environmental consequences, the notion of a conservatory provided a sense of refuge and cleanliness that would have been highly valuable not only to a building's inhabitants, but also to the corporation that sponsored this architecture. Wright was able to achieve this at the Larkin Administration Building, which was situated directly adjacent to the company's numerous factories, by incorporating conservatory spaces that were insulated from the industrial processes outside. Both as a typology and as a concept, the conservatory directly counteracted industry, even when built directly in its midst.

While Wright's conservatories were designed as insular environments at the Larkin Administration Building, the landscape design at the Palace of Light instead promoted a more fluid connectivity between the factory, its landscaped grounds, and the marvel of Niagara Falls. By locating the Palace of Light in Niagara Falls and hiring Olmsted as his landscape architect, Perky attempted to take advantage of the factory's setting. Capitalizing on its proximity to and association with the great cataracts, Perky created an exterior landscape that would further connect his factory to the natural wonder just beyond its walls. Reaching out to the surrounding landscape, rather than insulating the factory from it, Perky hired Olmsted to design a porous environment rather than a self-contained space. In doing so, Perky was able use the factory's surrounding context to his advantage, associating the industrial factory with a natural wonder merely by proximity and exterior landscape design. Conversely, Wright was able to integrate greenery and fresh air where there was none, designing conservatories in the Larkin Administration Building with similar aims to Perky, through nearly opposite means. While Perky could capitalize on the nature that already surrounded his factory, Wright had to create it from within. Although it was accomplished through different means, the Palace of Light and the Larkin Administration Building both sought to balance industrial influences with natural elements.

Glass played a primary role in accomplishing this balance at both buildings, as did the term 'conservatory.' Not only did glass play a primary role in conservatory design, but its use at the Larkin Administration Building and at the Palace of Light revealed its ability to enhance natural light and spatial qualities, communicate corporate aims and garner public trust. Able to be industrially produced in larger sizes, new shapes and with clearer panes, glass was increasingly utilized by architects, perhaps most obviously in the form of the daylight factory, a typology of industrial architecture that was prevalent in

America beginning in the 1890s. The Shredded Wheat factory, as an early daylight factory, utilized glass as one of its foremost building materials, advertising and absorbing its 844 glass windows into its very name: the Palace of Light. Covering a substantial portion of the factory's exterior, glass played numerous roles in the building's industrial function, providing plentiful light to the workers inside and conveying values such as corporate transparency.

Wright achieved similar effects with glass at the Larkin Administration Building, although his design incorporated it in a substantially different manner. The conservatories were housed under large panes of glass much like a traditional greenhouse, in ways that were not unlike the use of glass to create a light court for the entire building. While the exterior elevations of the building featured large, uninterrupted brick walls and piers resembling a fortress protecting its inhabitants from the outside environment, Wright utilized large swaths of glass at the center of the building, allowing light to filter in through the skylights above. Inside, the central light court was one of the most recognizable and successful features of the building, funneling light into the center of the building in order to reach all floors, from directly above. Glass was the primary feature of the exterior elevations at the Palace of Light, yet at the Larkin Administration Building it served instead as the primary material, along with the light it enabled, that Wright used to define the interior spaces of the building.

By utilizing glass in different ways, each architect prioritized light as a primary building material for constructing spaces that were simultaneously porous and insular from the surrounding environment. Historian Brent Richards refers to glass architecture from this era as a form of "constructing with light," which simultaneously created a fluid relationship with the outdoors as well as a well-defined interior environment within it. As a building material, glass could behave in ways where "it was simultaneously there and not there...manifested in the abstract, in reflections and transparencies, and in the play of surfaces: it sensationalized the light in space in a sensorial manner."[44] Wright's conservatories, much like their precedent at the Crystal Palace, utilized glass and light to blur the line between inside and outside while simultaneously insulating the two environments from one another. Glass in a conservatory thus acted not unlike a wall of windows in a daylight factory, providing a thin, nearly porous boundary between interior and exterior. Light could filter in from outside, bringing with it broad sweeping views of the world beyond the factory floor. While Wright's conservatories counteracted industry by providing an insulated naturalistic environment indoors, glass in a daylight factory like the Palace of Light achieved the opposite effect by bringing the outdoors inside.

The use of glass in this manner demonstrates that a conservatory and a daylight factory may not be completely different building types after all. While one is associated with greenery and the other with industry, these two seemingly opposing typologies are united by their use of glass to create a semi-porous relationship between interior and exterior. Reviewing the impact of Paxton's Crystal Palace on the development of new architectural styles and forms, Richards remarked, "Its cathedral-like proportions proclaimed a new transparency for the architecture of glass."[45] This transparency was at the heart of both buildings, and was expressed in corporate aims, programs and values even when not visible through solid walls. The quest for architectural transparency is evident in multiple approaches, including glass window-walls and glass roofs, but also the landscaping efforts conducted both inside and outside the buildings, which attempted to place the 'machine in the garden' and blur the boundaries between industry and nature.[46]

What glass could not physically accomplish in communicating about corporate transparency, the term 'conservatory' did. While Wright integrated a conservatory into the sixth floor of the Larkin Administration Building, Perky used other means to implicate his factory's association with nature. In addition to landscaping the exterior to reach towards the natural wonder of Niagara Falls, Perky officially identified his factory as the 'Natural Food Conservatory.' Determinedly labeling the building as the "Natural Food Conservatory" in the press, on postcards, and all official company materials until about 1908, Perky sent a carefully crafted message that this was not a typical 'factory.' One of the company pamphlets later described this seemingly grand transformation, stating, "As it reared its ornate towers and pinnacles high above the surrounding dwellings, the 'factory' changed to a 'conservatory,' and the astonishment of the residents changed to acquiescent admiration."[47] Called both a 'Palace' and a 'Conservatory,' the two labels were used somewhat interchangeably for the next twenty years, and neither of them alluded to a factory. Even though it was actually a food factory, the term 'conservatory' associated the building more with a greenhouse than with the smoke and machines of an industrial structure.

Furthermore, when the term is combined with the presence of plentiful windows in the 'Palace of Light,' the daylight factory itself appears transformed from a factory into conservatory. Where Wright devoted a portion of the Larkin Administration Building to be a conservatory space, Perky identified the entire building, not solely one portion of it, as a conservatory. Provided with plenty of daylight and filtered air, Perky's ‘natural food’ factory cultivated a metaphor of growth. This was further assisted by the historic context of the conservatory typology, which emerged in part due to the merging of new building technologies with horticultural research. As a place that transformed wheat into an industrial product, both the title and design of Perky’s factory can be clearly aligned with an attempt to capitalize on associations with nature. With plenty of windows that filtered in sunlight and air, the factory transformed wheat as if it was an industrial conservatory clad in glass, seemingly transparent for all to see.

Picturing Facades

What viewers saw, however, was a carefully crafted corporate image that was executed through both the medium of architecture and through architectural representations in advertisements. In the first twenty-five years of the factory’s residence in Niagara Falls, the Natural Food Company spent twenty million dollars in advertising, provided first by their own department and then also through the J. Walter Thompson advertising agency in New York City. Six offices on the mezzanine of the Palace of Light were devoted exclusively to advertising, as well as a printing department that produced the company’s pamphlets, postcards, booklets and cereal boxes. This significant investment was common amongst food producers at the time, which dominated the advertising industry for three decades in the early twentieth century.[48]

Food historian Harvey Levenstein has traced the impact of the food industry on the advertising sector, stating, “By 1901, food accounted for almost fifteen percent of its business and remained the single most advertised class of commodity until the 1930’s, when it was overtaken by automobiles.”[49] A slew of advertising campaigns accompanied the sudden boom in industrial food production, and major companies such as Kellogg's, Pillsbury, and Post provided stiff competition for the Natural Food Company just in the breakfast sector alone.

Amongst this competition, Marchand has suggested that advertisements can reveal the ways in which a corporation has attempted to counteract a particular insecurity. He indicated that companies "dismayed by a lack of personality might erect an impressive new corporate headquarters...or link its identity with its research laboratories."[50] Postcards, pamphlets, and booklets were some of the major forms these visual advertisements took, reaching out to the public in order to distinguish themselves from competing companies. Today, these advertisements serve as important historical documents, displaying not only the ways that this particular company extolled its own virtues, but also hid its weaknesses by taking liberties with its visual depictions of factory architecture.

In order to distinguish itself from other food companies, the Natural Food Company capitalized on the factory's proximity to Niagara Falls less than a mile away. Most of the company's advertisements (Figure 2 and Figure 7 are typical examples) utilized images of the Falls alongside the factory in order to create a strong connection between its products and the place of their production. This resulted in a consistent campaign to link Shredded Wheat not only to the Palace of Light, but to Niagara Falls as well. Capitalizing on the public's pre-existing fascination with the massive cataracts, the company systematically presented a dualistic vision of the city that, over time, raised the Palace of Light to Niagara Falls' status. Rather than compete with the Falls for visitors, the Natural Food Company instead packaged these two attractions as intrinsically related sights. By 1913, an advertisement insert in *Harper's Weekly* insisted upon this connection:

> One might as well visit Cologne without seeing the great Cathedral that has made the town famous as to visit Niagara Falls without seeing the factory in which Shredded Wheat is made. The great Cathedral is all there is to Cologne. When you think of Cologne you think of the wonderful triumph of architectural genius that towers high above the ancient city. Of course there is something else in the city of Niagara Falls beside the Home of Shredded Wheat, but most travelers think of the famous breakfast food when the name of the town is mentioned. [51]

These grand statements seem a bit heavy-handed, but they were not entirely uncommon for advertisements of the time. There is a sense of humor and self-awareness in the statement, acknowledging it unlikely that "most travelers think of the famous breakfast food" when thinking of Niagara Falls. Those chuckling undertones, combined with an overt attempt to create a serious appreciation for the company's industrial architecture and achievements, make the advertisement successful in not only attracting public attention, but also imbuing a sense of gravitas to the company and its product.
Perky ensured that the Palace of Light would become synonymous with Niagara Falls, linking the two places in advertisements for decades to come. The building served as an advertisement for his company, but also for the City of Niagara Falls at large. Place and product became almost synonymous, luring tourists who had come to see the Falls to also visit the factory for a tour. By promoting these two places together, Perky effectively aligned his industrial factory with one of the natural wonders of the world.

These efforts did not go unnoticed by Niagara Falls residents, many of which seemed to appreciate the additional attraction to their city. Local newspapers praised the company's impact on the city's development in 1912, stating "the Shredded Wheat Company has done more than possibly any one other thing, excepting the great cataract, to advertise Niagara Falls."[52] If the local newspaper is to be believed, Shredded Wheat advertisements actually succeeded in drawing more tourists to the falls rather than just to the food factory. One journalist noted the benefits of the company's advertisements linking the factory to the falls, indicating "they occasionally, of course, mention Shredded Wheat in the advertising, but the fact is it had put Niagara Falls on the map."[53] Today, the notion that an industrial food factory could *help* attract tourists to Niagara Falls seems doubtful, as the cataracts themselves are clearly still the main attraction. Additionally, contemporary tourists see the industrial status of Niagara Falls as a negative attribute, often preferring to visit the Canadian side because, as many Yelp reviews suggest, it is "less industrial." Yet a century ago, Niagara Falls was 'putting itself on the map' not only for its waterfall, but also for the development of electricity and the subsequent boom in industrial production occurring in the region. The factory was part of the industrial sublime that the region offered, where the natural power of Niagara was paired with the manmade power of industry. The Natural Food Company capitalized on this pairing by placing its factory alongside the falls in many corporate advertisements.

The attempt to equate product with place, linking Shredded Wheat to Niagara Falls, also created a reverse effect: connecting place to product. Though seemingly similar, these two processes originate from different means. While the Natural Food Company actively put forth a campaign that would lead consumers to remember their product because it is from Niagara Falls, one of the results of this promotion was to create pride in a city precisely *because* it produces the popular product. This new form of place identity, which brands a city through its industrial products rather than the other way around, can be seen in one journalist's curious message to the newest employees of the factory. In an attempt to attract the area's new residents to the nearby city of Buffalo, journalist Victor Speer published a welcome to the newly relocated factory workers coming from the former plant in Massachusetts, urging them to visit Buffalo as well as the Falls. He wrote:

> Buffalo is the finest Shredded Wheat biscuit of the municipal brand in the United States. The recipe by which it was made, found in the city directory, is to take 445,000 grains of human wheat, wash them, dry them, leave their hulls on and let them stand beside a huge bowl of clear water known as Lake Erie. This biscuit is sweetened by scores of churches, flavored by half a dozen theaters, enriched with seven hospitals, which doubtless will be emptied of the lame, the halt and the blind when you appear, and possesses ladies of dazzling and bewitching beauty. All women in our city are beautiful. Thus you will all feel perfectly at home there.[54]

By equating Buffalo to a Shredded Wheat biscuit, Speer promoted both place and product. Although his statement is a bit tongue-in-cheek, it is an early example of a long held connection between Buffalo and grain. Here, we can see that the connections between food and industry, architecture and urban identity, are stronger and older than one might initially recognize.

In the first three decades of the company's advertisements, nearly all of them include images that juxtapose the falls and the factory, continually connecting these two entities. Postcards such as Figure 2 and Figure 7 typify the presentation of these two elements, exhibiting the Palace of Light and Niagara Falls side by side. As other scholars have shown, postcards are an important medium for historical consideration, particularly in the context of factory tourism.[55] They provide not only visual representations of industrial architecture, but aesthetic interpretations of place, product and process that were designed to convey specific messages to viewers. While the Palace of Light was fixed in place, it moved throughout the world in the form of this medium, and thus its artistic representations in postcards reveals its role in both conveying corporate values and attracting customers. Here, the structure is rendered in a soft light, echoing the pale blues, yellows and pinks of the cataract image placed adjacent. Underlying this approachable softness, however, is a clear element of power, emanating from not only the mighty cataracts but also, through juxtaposition, the Palace of Light. The placement of the two together, occupying roughly equal space on the postcard, sends a clear message to viewers: these two sites are equally important, and the might of industry can parallel the might of mother nature.

These fluid boundaries between place and product reflect another central tension of the early twentieth century: the relationship between nature and industry. By the time Perky established his new factory in the city, Niagara Falls was perhaps the epicenter of this national and international debate. Before his factory was even completed, Perky was already attempting to counteract broader public concerns over the industrial use of Niagara's hydroelectricity. In the late nineteenth century, Niagara Falls was the center of a massive debate surrounding the use of Niagara Falls for industrial means. Led by Frederick Law Olmsted, an activist group called Free Niagara advocated for the regulation of industrial enterprises at the Falls. Even before Tesla had enabled the use of alternating current at Niagara Falls, Free Niagara was concerned about the future hydroelectric developments that would take place at this controversial site. Industrial enterprises had been attracted to the Falls long before hydroelectric power manifested in its contemporary form, and mills and manufactories emerged along the banks of the Niagara River as early as the 1820's. Furthermore, by the 1870's, the tourist industry had already made a noticeable impact in the area, with many new hotels, restaurants and entertainment complexes vying for prime real estate as close to the waterfalls as possible. Needless to say, many were concerned that the increasingly industrial and commercial interests in the area had little regard for preserving the site as a natural wonder.

With the aid of Buffalo native and future President of the United States Grover Cleveland (then Governor), legislation was passed in 1883 in order to acquire some of the islands above the Falls and banks along the Niagara River in order to establish the public Niagara Reservation. This was just the first major step in government interventions into industrial development at the Falls, and debates continued to surround the site as hydroelectric technology became increasingly sophisticated. Many were concerned that the Niagara Power Company would "run the falls dry," fearing that industrial greed would result in an empty Niagara River and cataract. Industrialists countered these concerns by insisting that Niagara Falls was certainly big enough to accommodate everyone, providing excellent scenery while supplying electricity to the entire state, or, as some extremists claimed, the whole nation. These debates were heard nationwide, appearing in newspapers alongside entertaining anecdotes of the latest tightrope walker or daredevil to 'conquer' the Falls.

Perky was certainly aware of this tension, and thus took great pains to appease his customers. Many of the company advertisements present an undercurrent of this historical context, but three examples in particular illustrate the convergence of these ideas at Niagara Falls, and more specifically at the Palace of Light. Three sets of images, the first official seal of the Natural Food Conservatory, a series of postcards, and the first Triscuit box design, illustrate the way these weighty debates were reflected in everyday public encounters with the food industry and its promotional advertisements. Together, these three sets of images reveal multiple choices made by the company's advertising department in order to convey the factory's complex relationship with industrial power generated by the natural wonder of Niagara Falls.

Shortly before he finished construction on the Palace of Light, Perky held a competition for artists to design the new official seal for the Natural Food Company. The winner was local artist Raphael Beck, who also had recently designed the official seal of Buffalo's Pan American Exposition. Beck won one hundred dollars in the competition, and his design soon appeared on corporate letterhead and documents for many years. The seal's design, seen in Figure 5, epitomizes many of the messages conveyed in the company's advertising campaign in subsequent images. It does so, however, without depicting the factory at all, marking a significant departure from the remainder of the advertising strategies that were used in the following decades.

Rather than depicting the grandiose Palace of Light, Perky chose a seal that instead communicated a return to nature. A local newspaper described the scene, stating that it "represents an Indian girl preparing flour in one of the vessels used by the Indians. It represents strikingly the motto of the Natural Food Conservatory in that it shows flour being made from the whole wheat."[56] The seal, however, represented far more than that, referencing industrialization but only through its absence. It used the visual rhetoric of primitivism to assuage any public fears of industrial pursuits destroying Niagara Falls. The Native American, notably a 'harmless' female, uses a laborious, machine-free process to create flour, a process indicated by the second Native American figure standing behind her holding a bundle of wheat, seemingly picked by hand. The second figure, indicated as a higher-ranking male by his larger headdress, seems to supervise more than work. Here we see an early, eerie predecessor to what would soon become normal in the factory tours to come: a privileged higher-class male watching other people work, many of them female.[57]

The viewer instantly knows these figures are Native American, communicated by the prominent visual stereotypes present in the image. The image is flooded with aesthetic clues to ensure that the figures' racial identity is clearly communicated. The feathers, pottery, beaded belts and stone tools may not be accurate traditional garb, but instead serve as indicators of race. These visual cues provide easily recognizable symbols of Native Americans, rather than as accurate representations of a particular tribe, such as the Tuscarora, who still live in the region today. Here, the Native Americans are important figures for evoking notions of nature, an unfortunate but common conception aggravated further by their physical contact with both Niagara Falls and wheat fields in this scene. Thus, their clothing and tools serve mostly as shorthand for indicating race-messages sent from a white artist to a largely white audience. By emphasizing these indigenous origins, this seal cleverly suggests that Shredded Wheat is produced in harmony with the mighty Niagara Falls, rather than abusing its power. Choosing an official seal that emphasized primitivism, nature and purity, Perky attempted to counteract the public's growing concern for the natural beauty of the Falls, even as his own factory was being constructed and operated by electricity from the cataracts themselves. Architecture does not make an appearance anywhere in this seal, which instead relies on communicating corporate values through only 'natural' imagery.

In contrast, nearly all of the postcards produced by the company prior to 1930 featured exterior views of the factory alongside a natural setting. Figure 6 depicts a typical postcard from this era, illustrating the factory situated amongst the landscaped grounds around 1905. The building is prominently perched atop the hill in the middle ground of the scene, depicted from a perspective that emphasizes its large volume as well as its many glass windows. Featured in the foreground, the landscaped grounds and paved pathways also play a significant role in this image. Leisurely carriages and pedestrians amble along the pathways between the factory and the shores of the Niagara River, finding shade and sunshine amidst the varied trees and bushes dotted throughout the grounds. In this postcard image, the scene focuses as much on the landscape setting as it does on the factory itself, occupying nearly equal amounts of space. While the Palace of Light is prominently displayed, it is the greenery surrounding the buildings that lends the image its character defining features, contrasted with the turbulent power of the Niagara River in the foreground. The gently sloping lawns, manicured pathways and carefully designed groups of trees and bushes convey a seemingly pastoral scene over which the factory presides.

This type of factory depiction was not uncommon during the mid-to-late-nineteenth century, a few decades prior to the construction of Perky's factory. Archivist and historian Sally Pierce confirmed "A bucolic style of factory depiction was the most common approach" at this time, wherein "the factory is a hub of energy in the midst of a serene, gently rolling countryside."[58] Bucolic views were typically composed in three major horizontal bands which, according to Pierce, "adopt the perspective of contemporary landscape painting, with the scene arranged in horizontal bands and the sky occupying one third to one half of the picture plane."[59] Although Pierce primarily discusses factory images from the 1870s to 1890s, Figure 6 seems to continue in this tradition. A sunny blue sky dotted with intermittent white clouds occupies the top third of the image, enabling the factory and the landscape to occupy the remaining two-thirds of the scene in nearly equal proportion. Yet while the visual relationship between landscape and industrial architecture in this postcard points to an older tradition of bucolic factory views, the image does incorporate a few aesthetic updates. The factory's smokestack towards the rear of the building, for instance, is not depicted with any smoke emanating from its tower, as would have been more commonly seen during the nineteenth century.[60] While the factory's smokestack would have, in person, emitted smoke during daylight working hours almost constantly, the postcard image does not illustrate this effect, likely in an effort to emphasize the factory's naturalistic setting rather than its negative environmental effects.

Executed through drawing and painting techniques rather than photography, the illustrator was able to make some other visual alterations to the reality of the scene. As a result, this illustration reveals some of the advertising aims that the company wished to convey through the image. The compositional emphasis on the landscaped lawn and pathways, along with the smokeless smokestack, provide just two indicators that the illustrator attempted to convey this industrial factory as a more pastoral, even institutional scene than it may have appeared in reality. Even the factory's close proximity to the Niagara River appeared much more immediate in the postcard image than in person. While Perky did indeed own all the land between the factory and the river, the lawn stretched out over several acres and the view was more obstructed by trees, fencing and topography than it appeared in the image. Each of these components provide visual insight into the ways the illustrator, and the company's advertising department, attempted to convey this factory in a context that was far more bucolic than it was industrial.

The choice to depict the factory during the day, rather than at night, raises some curiosity amidst the important role that electricity played at the Palace of Light. Company pamphlets and booklets frequently emphasized the important role of electricity from Niagara Falls at the factory, influencing Perky's decision to locate there and enabling the production process in vital ways. Yet despite the major impact that Niagara's hydroelectricity had in designing the factory and producing Shredded Wheat, there seem to be no nighttime images of any kind amidst the company's numerous postcards, pamphlets, booklets or photographs. All of the images encountered during research in several archives depict the factory during daylight. In this case, the absence, rather than presence, of nocturnal images may indicate corporate motives to emphasize the natural, rather than artificial, qualities of the factory in order to tame the industrial presence of this building.

At this time, several American and European photographers had been capturing night views of city streets, particularly those associated with the Photo-Secessionist or Pictorialist Movement. Although the Shredded Wheat company did not participate in the trend, "urban night photography by artificial light," Mary Woods has asserted, "was widely discussed [by the early 1900's] and remained an important trope in the years to come."[61] Creating these night views presented some technical challenges, requiring long exposures, a precise combination of lighting and weather, or simply the patience to withstand these conditions. Alfred Steiglitz, who produced several celebrated night photographs, "intuitively recognized the potential that large cities offered for night photography, with their abundance of artificial light reflecting off building facades or wet pavements."[62] Architecture provided some of the most favored subject matter for these night scenes, as their inherent stillness was well suited to long exposures. Although electric lights were not used for long exposures, electric lighting simultaneously became an increasingly popular phenomenon during the late-nineteenth and early-twentieth centuries, first devoted primarily to special events and the eventually towards more permanent lighting programs. In his volume *Architecture of the Night*, architectural historian Dietrich Neumann devotes considerable attention to the ways in which "illumination changes, even obscures the appearance of architecture."[63] Bright, colorful displays attracted large crowds of people to major events such as world's fairs in places like Paris, Chicago and Buffalo.

More so than most American cities, Buffalo and the Niagara Falls region were strongly associated with electric lighting displays. In 1901, the Pan American Exposition deemed Buffalo the 'City of Light,' celebrating one of the world's first long distance transmissions of electricity from Niagara Falls to the city's fairgrounds in a nightly display of 240,000 eight-watt bulbs that lit the fair's architecture, fountains and pathways. The focal centerpiece of this display, which thousands of fairgoers attended nightly, was the 375-foot-tall Electric Tower designed by New York architect Howard Cobb. Studded with 44,000 lights and topped with a searchlight that could be seen from over twenty miles away in Niagara Falls, the Electric Tower was the crown jewel of the fair's ode to the cataract's hydroelectricity. Positioned at the northern end of the Court of Fountains, the base of the tower connected to two colonnades stretching east and west around the water features, which cast soft reflections in the adjacent pools. Connecting the tower to the long reflecting pool and fountains, a waterfall feature was located at its base, pouring water out of the center of the building in a continuous flow that circulated the fountains below. With a waterfall at its core, the Electric Tower paid homage to Niagara Falls as the source of the fair's electricity through architectural design. Lighting was also incorporated into this miniature cataract, which was illuminated by dozens of bulbs placed within the building behind the water. A nightly display attracting thousands of visitors at dusk who gathered to witness the transformation at twilight, this combination of lighting, water, and architectural designs was inherently temporary and lasted only for the duration of the fair. The official fair photographer, C.D. Arnold, captured dozens of images of the display, with numerous images that celebrated this 'architecture of the night' as much as they also celebrated the technical potential of night photography.

As temporary lighting displays gave way to more permanent lighting programs, Niagara Falls again provided a stunning visual example of this type of nighttime attraction. In the first few decades of the twentieth century, Neumann stated, "permanent commercial lighting and electric advertising soon began to compete with the lighting of public events in the urban realm, thus challenging its exceptional nature."[64] Tracing the history of nighttime illumination at Niagara Falls mirrors this evolution, where the waterfalls experienced similar stages as architectural illumination on the path to permanent installations. Like architecture at World's Fairs, the Falls were first lit only for very special events in grand lighting displays. Beginning in 1860 and continuing into the Pan-American exposition of 1901, Niagara Falls had been illuminated approximately five times for short periods in order to celebrate exceptional occasions. The first step towards regular nightly illuminations occurred in 1907, when the Falls were lit using projectors place across the gorge for a duration of several weeks. Permanent lighting technology and funding did not arrive at the Falls until 1925, however, and by this time several skyscrapers had already installed nightly illumination in cities like New York. Once the Niagara Falls Illumination Board was established and fully funded in 1925, a permanent lighting scheme was installed at Niagara Falls for nightly viewing. While the illumination soon became a well-attended attraction, the Falls remained mostly a daytime tourist site until this time.

Night views of Niagara Falls began to appear on postcards in the late 1920s, and by the 1930s these images were among the most common purchased at this heavily attended tourist destination. By 1938, historian Jeffery Meikle asserted, "the most popular postcard depictions of Niagara Falls were of its most dramatic artificial feature, nightly illumination by searchlights playing colored lights over the surging water."[65] The combination of artificial electric lighting with the sublime nature of Niagara Falls became a marvelous spectacle for tourists at this time, and postcards emphasized this powerful blend of natural and manmade wonders through night photography and captions. Observing the impact this illumination had on the Falls, historian David Nye stated that these colored spotlights "permitted the landscape to be edited, simplified, and dramatized."[66] Part of that editing process was visible in the postcards of this spectacle, which then simplified and dramatized the complex relationship between artificial lights and the natural wonder used to power them through manmade devices. Postcards of Niagara Falls night views emphasized not only the spectacle's beauty but also human control over nature, seen in captions such as "Nature with the help of Man illuminates itself into a gorgeous splendor."[67] The nightly illumination of Niagara Falls, along with the photographs and postcards that depicted it, provided a clear backdrop for onlookers to grapple with the relationship between industrial technology and natural might. Even before the cataracts were permanently illuminated in the 1930's, Niagara Falls played a substantial role in negotiating this relationship through lighting displays at the Pan American Exposition in 1901. Opening at the same time, the Palace of Light embodied the spirit of merging natural energy with industrial power. Why, then, when electricity was so integral to both Niagara Falls and the Palace of Light, did all of the company's images depict the factory in daylight?

Conceptual choices, rather than technical limitations, may have inspired the advertising department's decision to depict the factory during the day rather than at night. First of all, postcards of factories at night were relatively rare during the early 1900s, so it was not entirely out of character for this industrial company to promote itself through daylight images. Furthermore, many daytime images were doctored to appear as nighttime images, often by hand coloring or other means of alteration. A small amount of images of steel mills at night have survived during this time, which depicted "a hundred black chimneys silhouetted against the night sky, ruddy with the reflected light of vast furnaces,"[68] but the Palace of Light was a daylight factory, and thus inherently different in terms of architectural character from a steel mill. Additionally, these images were overall quite rare before the 1910s, perhaps due in part to technical considerations: mills were typically located in large industrial complexes away from other buildings, and therefore lacked other sources of nearby light that could have been used to balance the image's contrast as in city streetscapes.

As we have seen, however, night views of Buffalo and Niagara Falls were otherwise common at this time, particularly in the context of the 1901 Pan American Exposition. Perhaps the company wanted to provide an alternative to that plethora of nighttime views at the fair, and therefore delineated itself from the exceptional and temporary nature of the exposition and instead depicted the factory as a stable, constant, and daily presence. Buffalo had already been labeled the ‘City of Light,’ and was thus associated with using electricity throughout its streets, homes, and businesses at night. The Shredded Wheat company’s careful choice of imagery seemed to suggest that Niagara Falls, Buffalo’s counterpart in many ways, would therefore function instead as a ‘City of Daylight.’ Natural light, rather than the artificial light of hydroelectricity used to illuminate Buffalo, better expressed the corporate values at the factory in Niagara Falls.

Like many of the images produced by the company over time, the daylight depiction of the factory in images like Figure 6 embodies the struggle to reconcile, and simultaneously promote, the relationship between industry and nature. While Niagara would always be at least in part a natural scene, even if illuminated by artificial light at night, Perky had to take more precautions in depicting his inherently industrial factory. As a completely manmade structure, the factory had to earn that naturalistic association, and did so largely through its visual depictions on postcards. Perhaps Perky and his advertising team understood that a nighttime view of the factory, lit by artificial light that some people believed was ‘stolen’ from the cataracts, would only contradict his efforts to envision this structure as a benevolent institution committed to enhancing nature rather than undermining it. Emphasizing his factory and landscaped grounds in daylight scenes with sunshine and fresh air, Perky used imagery to convey the opposite of C.D. Arnold’s view of the fair in Buffalo. At the Palace of Light, Perky promoted the architecture of daylight.

Although it did not do so directly through images, the company also made a considerable effort to advertise the beneficial impact of using the Falls' hydroelectricity in the factory's production processes. Strengthening the connection between Niagara's energy and the Natural Foods Conservatory, Perky erected a colossal electric sign on the roof of the Palace of Light in 1906. The sign read "The Home of Shredded Wheat" on the top, with the bottom row saying "Visitors Welcome." Placed 104 feet above the ground, each letter was six feet tall and soared higher than any surrounding building. The message could be seen from miles away, as 1400 incandescent lamps lit the entire sign using thirty-five horsepower of local electricity.

Just a few years after the electric demonstrations at the Pan American Exposition, electricity still featured prominently in advertising not only products, but also places. Heinz had erected a similar attraction in Manhattan a few years earlier in 1901, displaying a gigantic, electric pickle on the site that was later to become the Flatiron building. The fascination for electric technology was increasingly blended with the public interest in industrial production, and of industrial food production in this case.[69] Constructing this sign was a physical manifestation of these two worlds, serving as an architectural advertisement for the benevolent potential of technology amidst mass-produced food. Perky's grand display of electricity was one of the primary ways in which he successfully conflated place and product, using electricity as the connective tissue between Niagara Falls and the methods of producing Shredded Wheat.

Although the company did not depict the factory lit at night, it did not hesitate to depict electricity in connection with the factory in other ways. Electricity was in fact an integral component to some of its product advertisements, appearing in a number of other ways shortly after the factory was opened to the public. In 1903, a few years after the seal was adopted, the company debuted a new product: the Triscuit. Far more than just a new kind of cracker, Triscuit was marketed as a marvel of modern industrial production methods. As the first food that was baked in mass quantities entirely by electricity, Triscuit ushered in a new era of industrial food production that would soon become prevalent across the world. While electricity had been applied to baking before, the Triscuit is the first time that electric baking was made for large-scale commercial purposes, and the result was instantly a success.[70]

For the Natural Food Company's advertising offices, the connection between the Triscuit and Niagara Falls electricity was irresistible. This new product offered the opportunity to demonstrate to consumers the benevolent potential of harnessing Niagara in order to provide healthy food. Triscuit advertisements like Figure 8 depicted a bowl of the product at the base of Niagara Falls, radiating with bolts of electricity. Nature and industry are presented as virtually synonymous, and verbal phrases, such as 'baked by electricity' and 'the electric baked biscuit,' only reinforced this message. The product here is as important as the method of its production, and the advertisement uses one to sell the other. Marketing the Triscuit as a marvel of hydroelectricity not only further linked Niagara Falls to the Natural Food Company, but also emphasized the importance of the industrial process used to make the product, rather than marginalizing industry like the company's seal.

The Triscuit's first advertisements provided a verbal and visual combination of imagery that reinforces the natural origins of the food while simultaneously ushering in a new era of industrial production techniques. A promotion from 1903 emphasized electricity in tandem with American Indian production techniques, an odd combination that reveals the tension between the two ideals of industry and nature at the time. The advertisement states,

> Triscuit, the highest achievement known to the science of food production, is made possible by that other great achievement, the application of electricity; for Triscuit is made and baked by electricity. As the North American Indians prepared their staff of life by first simply crushing the whole wheat grains and then baking between heated stones; so the whole grains of wheat, after cleaning, are filamented, formed and baked in the electric machines of The Natural Food Company of Niagara Falls NY USA...In the manufacture of Triscuit, no attempt has been made to improve upon the chemistry of Nature...and it's good for the body in accord with Nature's laws.[71]

The rhetoric employed here is simultaneously rooted in the concept of an ancient Native American tradition and extends towards the future of industrial machines. While this promotion does emphasize the highly sophisticated technology used to create Triscuits, it also situates this industrial achievement firmly within the context of older food traditions, depicting industrial food production as the next evolutionary step in a linear vision of progress that originates in a white man's perception of Native American traditions. As much as Triscuit is portrayed as "the highest achievement known to the science of food production," it is also depicted as a natural process, one embodied in the source of its power: Niagara Falls.

The cataracts are the keystone to this hybrid representation, serving as a crucial link that enables these advertisements to portray the Triscuit as the consumable intersection of nature and industry. They provide geographic and historic context for both the supposed Native American tradition of wheat production and the source of modern industrial power. In terms of advertising, they offer a pre-made, powerful symbol for marketing an industrial food product as a naturally occurring, wholesome food. It is thus no coincidence that an image of Niagara Falls could be seen on every Shredded Wheat cereal box for almost a century, as the cataracts had the rare capacity to embody two seemingly opposing value systems- that of the natural sublime and the technological sublime. Nye distinguished these two visions, suggesting that "Kant's sublime made the individual humble in the face of nature, the technological sublime exalted the conquest of nature."[72] At Niagara Falls, more so than any other American place, Perky could convincingly promote his product as a new technological achievement born out of an ancient tradition of natural foods. Triscuit's early slogan, "Nature's food by Nature's process," succinctly summarizes this corporate approach, which uses Niagara Falls as the connection between the marvels of the natural and industrial realms.

Part Two: Interior

While the Palace of Light's exterior conveyed a conservative, reliable neoclassicism set within and powered by nature, the interior exhibited a bold attempt to advance industrial architecture into a new era of technological improvements. Constructed five years before federal regulations required factories to meet certain cleanliness standards, the Palace of Light was ahead of its time as a pioneer in these developments. Multiple devices designed to clean and cool the building's air, surfaces and machines were embedded into the walls of the assembly line spaces, marking the company's commitment to state-of-the-art technology on the factory floor. These concerns for product purity, consistency and cleanliness also extended beyond the industrial spaces within the building, and were also evident in the design of many different types of rooms devoted to employee welfare and health. The exterior of the building encouraged onlookers to see through the walls of windows, and what they found inside was an industrial palace devoted to hygienic, benign conditions that was promoted as a place where industry could improve, rather than detract from, the lives of its workers.

Working Spaces

The interior plan of the Shredded Wheat factory was designed in tandem with the path of the production process, indicating the direct relationship between the industrial production methods and the factory architecture itself. The layout of rooms is organized both horizontally and vertically, designed to accommodate specific machinery on each floor as well as provide transit for the grain between floors. Overall, the grain moved from top to bottom in a manner that is somewhat similar to a grain elevator, with the raw grain entering the building on the top floor and the finished product exiting the building through shipping on the first floor. Following the path of grain through the building can reveal not only the way that Shredded Wheat was made at the Palace of Light, but also the relationship between the building's interior plan and the production process.

The production of Shredded Wheat at the Palace of Light consisted of six major steps, each closely aligned with the machines that performed each function. The process began at the top floor, the fifth floor, where the wheat arrived from the silos that were attached to the building. The silos elevated and stored the wheat until the process was ready to begin, and then the grains would be funneled into the fifth floor for cleaning. On this floor, the unprocessed grain would pass through twenty-two unique machines, each designed to rid the grain of a specific contaminant, including dust, dirt, stray strays, or sift out broken or defective pieces.[73] After the grain passed through each of these machines, spanning about two-thirds the length of the fifth floor, it would reach a giant steel cylinder. These steel cylinders were designed to cook the grain for thirty minutes by steam, aided by large revolving steel paddles inside that would stir and agitate the grain during the process in order to break up the starch. These machines, like many inside the Palace of Light, were specifically designed by Perky and Deeds for the production of Shredded Wheat, and thus were unique to the building.

Once cooked, the grain would travel to the next floor below, dropping through a hopper attached to the steam cylinders and integrated into the piping system of the building. The grain would then be dried while on the fourth floor, by dropping into a drying machine that removed excess moisture from the grain. This machine spanned a significant length, enabling the grain to be fully dried through heat and then dehumidified. Company pamphlets describe the drying machine as 'extending perpendicularly through two floors,' indicating that the machine not only dried the grain, but also enabled it to travel between stages of the production process on different floors. This type of device blurred the lines between architecture and machine, serving a circulatory purpose as well as an industrial one.

After the grain was dried on the fourth floor, it was fed into the hoppers of the third floor. There, the wheat was shredded by large shredding machines that spanned nearly the entire length of the room. Each shredding machine, seen in Figure 9, was eighty-feet long with thirty-six pairs of steel rollers. The wheat was fed through the rollers and then "dropped upon an endless chain, laying layer upon layer, until they form the thickness of the biscuit." [74] Once shredded and layered, the wheat would be divided into smaller pieces and cut by a mechanical device, then dropped onto a large baking sheet that holds fifty two biscuits each. These shredding machines, designed by Perky himself, were placed towards the center of the room, with access for human assistance on both sides of the machines. This required the room to feature a long span of uninterrupted space, free of any centrally located load bearing columns, beams or supports. The resulting room is indicative of a typical daylight factory design, with plenty of windows providing natural light on the factory floor and an open floor plan to accommodate large machines.

On the same floor, the pans of Shredded Wheat biscuits would then be baked in a large oven. Multiple pans of biscuits were placed "in the arms of a large drum shaped like a Ferris wheel, which revolves in an immense oven until the biscuits are baked."[75] Although the company did not publish any photographs of this oven, they referred to it as a 'Ferris wheel oven' several times. The circular shape of this oven was likely designed to enable the pans to be loaded into the oven racks one at a time as they came out of the shredding machines. Rather than stopping or opening the oven to insert a new rack each time, the circular shape of the rotating racks enabled the oven to constantly bake the wheat at a consistent temperature as each new pan was inserted into the wheel. Once the pans finished baking in the 'Ferris wheel oven,' they were then passed into a second oven, designed to thoroughly dry the interior of the Biscuit, completing the baking process. Once dry, they were placed on a conveyor belt that carried them to large packing tables, where workers placed them into large cartons.

The completed biscuits were then transported back up to the fourth floor in their cartons, where they would enter the sealing and packing room. There, the biscuits would be packaged by machines specifically devised for this task at the factory, and "nothing like them could be found in any other food factory anywhere."[76] The machines would automatically open the flaps of the cartons, coat them with a thin layer of dextrine (vegetable glue) and then fold them back together, pasting a strip of paper to seal the edges closed. As one pamphlet described, these machines impress the visitor as being 'almost human' in their operation," calling them "mechanical marvels of ingenuity."[77] Once packed and sealed, the cartons were then carried along on a conveyor belt between steam cylinders to complete the process, and "by the time they reach the end they are dry enough for packing in the wooden cases." These cases, also assembled by machines, were then mechanically nailed shut and passed along a conveyor belt that counts and registers the number of packages, stamping them with a final packing date. During this six-step process, each Shredded Wheat biscuit traverses through three different floors, six different rooms and over thirty-five machines to become the final packaged product. Each day, the factory produced nearly a million boxes of Shredded Wheat biscuits. The sheer volume of production indicates the efficiency with which Perky designed, arranged and integrated his multiple machines within the factory architecture. As this process demonstrates, architecture and machines are deeply intertwined on the factory floor, each supporting and accommodating the other in order to ensure the product can be assembled in the most efficient manner. The building's interior plan reveals a continuous system of mechanical flow, using conveyor belts, multilevel hoppers and cylinders to not only process the wheat at various stages, but also aid its flow throughout the building.

The work flow process was similarly integrated into the architectural design for the Larkin Administration Building, resembling an overall downward movement of paper throughout the building from the upper to lower floors. Although the Larkin Administration Building was designed to process a very different product than the Palace of Light, the internal layout of each floor was designed to maximize the efficiency of each department and their relationship to one another. As at the Palace of Light, the flow of work tended to drift down from the top floors of the building towards the ground floor. Designed to process mail and correspondence rather than shredded wheat, however, the layout of the Larkin Administration building was accordingly different from the Palace of Light. Utilizing the tall, rectangular shape of the building, each floor was organized into peripheral quadrants along the balconies that opened onto the central atrium and skylights. As a business that conducted the majority of their business through mail-order catalogues, the Larkin Company received upwards of 5000 letters in six separate deliveries six days a week by the time Wright was hired to design the administration building.[78]

Organizing the internal layout in direct response to the company's need to organize the process of receiving, sorting, reading and responding to all of this mail, Wright worked together with Darwin D Martin in order to streamline the flow of paper within the building. Mail would be delivered to the building by vehicle, driven through an opening on Swan Street to a receiving area in the above grade basement. From there, it was loaded onto elevators and taken directly to the third floor. The third floor served as the primary mail sorting center, where employees would organize each mail shipment into a system of ten groups based on their geographic location. These groups were divided by state, and the ten groups were distributed throughout the second, third and fourth floors. With four state groups located on the fourth floor, three on the third, and two on the second, the layout of this organization system was the result of a close collaboration between Wright and Martin.[79] Once the mail had reached its proper group on the correct floor, it would be processed by that particular department and then continue its gradual downward movement through the building in order to reach the ground floor. Responses would be transcribed and then typed in the typewriter operator's department on the second floor, and then would continue moving to the floor below for final review by the appropriate executives. Multiple departments were located on the first floor of the building, within clear view from the balconies at each floor above. All of the executive offices and meeting rooms, as well as the cashier and accounting department and secretary clerks were located on the first floor, which operated as "the seat of executive authority."[80] Rather than placing these executive functions at the top floor of the building in a more traditional hierarchal arrangement, the work flow was instead oriented in the opposite direction. Traveling from the top of the building downwards, this arrangement more closely resembled the gravitational flow of paper towards the foundation of the company, and the building, at its base.

In some ways, the continuous path of production in both of these buildings resembles industrial assembly lines where humans and machines worked together as parts of an overall process. Although this production process was far more industrial in nature at the Palace of Light, Wright's careful design for work flow at the Larkin Administration

Building applies these industrial considerations to an office setting in some ways. Particularly at the Palace of Light, the integration of the industrial process into the architectural design typifies the internal layout and aims of an American daylight factory at the turn of the twentieth century. Yet despite these characteristics, the term 'daylight factory' brings with it a somewhat messy history of overlapping structural innovations and material adaptations, and thus requires more examination before fully identifying the Palace of Light as a true representation of this typology.

The path, process, and overall plan of these production spaces strongly resembles a Fordist assembly line designed to accommodate Taylorist methods, seen in many American daylight factories during the early twentieth century. Although the term Fordist references the system later associated with Albert Kahn's multiple, massive factories for Henry Ford in the Detroit region, perhaps it can be retroactively applied to the Palace of Light as well. Built eight years prior to the 1909 Highland Park plant for Ford in Detroit, the Palace of Light exhibited many of the same qualities typically associated with Kahn's work. The factory in Niagara Falls included several design elements that Kahn incorporated into his Detroit factories a few years later: Long, expansive spaces uninterrupted by supporting columns, plentiful daylight and fresh air provided by multiple walls of windows, and a sequential arrangement of rooms and circulatory spaces that was specifically designed for the production of a particular, standardized product made mostly by machines. Although the Palace of Light was designed to make breakfast cereal and the Highland Park plant automobiles, the factory in Niagara Falls, "came to celebrate less the product than the process."[81] In this way, the

Palace of Light was as much a daylight factory as any of Kahn's factories that followed-it was simply executed in different materials and was therefore more limited in scope.

The Palace of Light was of course not the only factory of its kind to precede Kahn's more historically recognized Detroit factories. The timeline for this small span of years, between the Palace of Light in 1901 and Kahn's Packard 10 plant in 1903 and then Highland Park plant for Ford in 1909, was marked by a progression of building materials evolving from brick to concrete. Banham has described the daylight factory as a typology that was "two centuries in the coming," but its "classic, concrete form" developed relatively quickly once it had arrived, primarily between 1903 and 1910, when "it had already reached a startling and precocious maturity."[82] Just one year after the Palace of Light was completed, historian David Gartman argues, "Between 1902 and 1906 pioneering industrial architects like Ernest Ransome and Albert Kahn replaced brick pier and glass in-fill construction with the concrete-framed factory."[83] Banham, for instance, identified the United Shoe Machinery company building built from 1903-1906 in Beverly, Massachusetts as one of the "first fireproof, daylit, concrete-framed daylight factories in its canonical form."[84] Built by Ernest Ransome, who Banham deemed the "inventor of the concrete frame in its American version and thus of the true daylight factory,"[85] the concrete-framed factory exhibited some of the earliest architectural applications of scientific management principles, evident in its immensely long production blocks and uninterrupted production spaces. Other daylight factories were constructed at this time as well, including Kahn's own early experiment with the typology in Buffalo at the Pierce Arrow manufacturing complex in Buffalo in 1903. In 1903, Kahn also designed the Packard Plant #10 in Detroit, which marked the first major use of reinforced concrete framing with trusses in a large-scale automotive factory. Working for Ford in 1909, Kahn improved upon the use of these building materials and their application to mass-production systems at the Highland Park plant, which many historians recognize as one of the first major examples of a classic daylight factory. While architectural historians have struggled to pinpoint the exact year, factory, or location where the typology arrived, most date the emergence of the daylight factory to a year or two after the Palace of Light was constructed. This timeline often hinges on one particular definition in common, which is notably aligned with the emergence of the concrete, rather than brick, structure. For most historians, therefore, the daylight factory emerged in 1902 or 1903 as a typology that was defined partly by the inclusion of concrete framing. By these definitions, the Palace of Light was not a daylight factory.

As a particularly early example, the Palace of Light did lack some particular characteristics that later emerged in the more classic, concrete expression of the building type. Constructed primarily of brick with steel reinforcements, the building was not structurally supported by concrete as in many subsequent factories. The use of brick also limited the size and scale of the building, requiring slightly smaller windows than Kahn's later works in Detroit. Furthermore, the Palace of Light had a smaller footprint than the massive factories Kahn built in Detroit, which eventually occupied several city blocks. Built nearly as tall as it was wide, the Palace of Light incorporated more vertical floors than many of Kahn's later works, which instead spread outwards along a seemingly indefinite horizontal axis. Most of these qualities relate directly to the building material itself, as brick brought with it more structural limitations than reinforced concrete.

Nonetheless, the spatial aims and structural motivations were much the same as Kahn's Detroit factories, and the variations that appear were due to these material differences.

Conversely, the Palace of Light also included some elements that were later downsized or eliminated in the other Fordist factories to come. Spaces designed primarily for the visiting public, such as lavish lobbies, restrooms and resting rooms, were present at the factory in Niagara Falls to an extensive degree, devoting considerably more surface area to these audiences than Kahn's Detroit factories would in the following decade. By World War I, mass-production had become so dominant, as both an economic system and as an architectural client, that the factory building became, historian Terry Smith observed, primarily "an assembling of purposes, the movement of machines, the spaces in which materials are stored and in which jobs are done, but nothing more. Nothing is 'left over.'"[86] Spaces designed to benefit workers did remain, but were pared down in the attempt to minimize their physical impact while also providing lip service to labor unions and employee welfare programs. At the Palace of Light, however, multiple large, luxurious spaces were incorporated into the brick and glass factory, enhancing the building's non-industrial image as 'more than' simply and only a factory. With the structural and material advancements invented and adapted by engineers like Albert Kahn, factories began to appear inherently more 'industrial' on both the exterior and interior, leaving little room for social rooms even as the factories themselves grew larger.

In this sense, the Palace of Light represents the end of an era and the cusp of a new one, where its brick-clad structure attempted to accommodate large open spaces in a manner that would soon be associated primarily with Albert Kahn's reinforced concrete factories. The building's interior plan, exterior façade, structural support system and character-defining features clearly align with the Taylorist values and Fordist assembly line system oriented towards a form of mass production made possible specifically through structural elements. In light of these multiple associations, the Palace of Light thus urges a reconsideration of these typological definitions, which would otherwise deny the building as a 'daylight factory' on material grounds. Perhaps it is time to move beyond the more objective qualities of a daylight factory- a particular year or material- and instead consider the motivations behind and execution of the factory design itself. Some architectural historians have already been moving towards a more cohesive definition of the daylight factory that would perhaps incorporate the Palace of Light as an appropriate example of an early daylight factory, examining the typology's development in tandem with new building materials, technical innovations and Taylorist systems. In *The Rational Factory*, for instance, historian Lindy Biggs examines the simultaneous development of Kahn's factories and Ford's assembly line methods, putting forth the notion of an interdependent relationship between factory architecture and industry. Rather than viewing factories as either a product of or a catalyst for Ford's innovations, as some other historians have done, Biggs insists that architecture and industry are intensely intertwined, each influencing and shaping the other to produce a continually evolving machine.[87] Following in Bigg's footsteps, and the path similarly carved by historians like Banham and Smith, this dissertation considers the Palace of Light a daylight factory for its clear architectural relationship to early Fordist production methods in both structural character and overall plan.

Overall, the decision whether to categorize the Palace of Light as a daylight factory brings with it a larger challenge to the ongoing process of architectural historiography. What should determine a building typology, materials and timeline, or intention and execution? Some combination of these elements, and many more, could lead to a more inclusive and holistic history of industrial architecture, which has henceforth been constructed largely as a series of technological innovations, economic developments, and architectural adaptations. Envisioning a break from this industrial historiography, Banham wrote, "this history would not be a simple linear progression, rational innovation by rational innovation."[88] He instead cultivated a messier history, which he found in both Buffalo's grain elevators and the daylight factories, where, "There would prove to be few radical breaks or flashes of startling originality; rather, it had been a cautious and none-too-precipitate advance into the world of concrete framing and total daylighting."[89] The Palace of Light has somewhat disrupted this linear view, exemplifying early Fordist architectural forms and plans while also lagging behind other examples in terms of structural materials. The 'total daylighting' Banham described was a process of overlapping discoveries, innovations and inspirations that occurred in partial, experimental forms for a number of years. The Palace of Light therefore forces us to acknowledge that the daylight factory did not evolve through a set of exceptional 'Eureka!' light bulb moments brought on by a handful of brilliant architects, but instead through an intermediate series of careful adaptations that led to a more gradual process of illumination, seeping into a room like light through an entire wall of windows.

Cooling Spaces

Despite the presence of many windows at the Palace of Light, they were rarely opened. In order to maintain product consistency, climate control was a fundamental requirement for this baking process. The invention of air conditioning, in Buffalo, made an immense impact on industrial architecture beginning in the early twentieth century. Although the exact date of its invention is difficult to pinpoint, it emerged from roughly 1900-1909 as a series of consecutive developments. Due to its invention by Willis Carrier at the Buffalo Forge Company, many buildings in the Buffalo area served as his laboratory during the early phases of its creation. The first incarnation of air conditioning was developed by Carrier in Buffalo in response to a Brooklyn client's needs. The Sackett & Wilhelms Lithography and Printing Company was concerned that irregular temperatures and more importantly, humidity in the air, was creating inconsistent prints at the factory, creating expensive mistakes. Primarily interested in removing excess moisture from the air rather than cooling the temperature, Carrier invented an early form of air conditioning for Sackett & Wilhelms, which soon found its way into many buildings nationwide.

Perky shared similar concerns to the Brooklyn printing company when building the Palace of Light, as excess humidity would result in soggy biscuits. Furthermore, Perky's factory also contained a sizeable printing department, where a controlled climate was necessary in order to ensure the consistency of printing the various cartons, pamphlets, advertisements and booklets that occurred in house. Addressing these climate concerns, the Shredded Wheat factory was thus equipped with an early form of air conditioning when it was built in 1901. While Carrier did not debut his invention until

July 1902, the Palace of Light included a climate control system that performed a simliar function one year earlier. Likely devised by engineer Edward Deeds, the system provided a controlled climate that benefitted both the factory employees and methods of production. Despite the marvel of the structure's many glass windows, company promotions insisted that they "never need to be opened," due to this ventilation system.[90] Company pamphlets boasted about this climate control system for its cleanliness, stating, "The air in the Administration building is changed every seven and one half minutes, and throughout the main building every fifteen minutes."[91] The system worked by replacing inside air with outside air, where "the entering air being washed by sprayers in the pipes, and controlled by thermostats and a new device called a 'humidostat' made a complete circuit of the building in seven minutes."[92] This humidostat, which like Carrier's subsequent invention prioritized humidity over temperature, paved the way for many future developments that led to modern air conditioning. This early attempt at dehumidifying a building can provide insight into the slippery definitions of early climate control units, complicating some of the claims that have previously been made for other buildings as the first to install air conditioning at the turn of the twentieth century.

Although many buildings have claimed to be the first to introduce modern air conditioning, scholars usually credit Wright's Larkin Administration Building (1906) with this achievement. Several academics and architects land on both sides of this contentious claim. Wright himself referred to the Larkin building as "one of the first 'air-conditioned' buildings in the country,"[93] and architectural critic Russell Sturgis had previously supported similar statements when the building first opened.[94] On the other hand, Reyner Banham's fascination for the building did not lead him to make the same claim, stating instead that "In the basement it [the air] was cleaned and heated, or after the installation of the Kroeschell refrigerating plant in 1909, cooled- but never humidity controlled." Similarly, former employee Jeannette Weide recollected, "There was no air conditioning, but it was 'air cooled.'"[95] While Banham acknowledged "most historians have passed [this claim] over as if unnoticed,"[96] he devoted considerable attention to unraveling these technological elements. Wright scholar Jack Quinan echoed his efforts in the question, "Was the Larkin Building air-conditioned or not?"[97] The results are inconclusive, and depend largely on the exact definition of air conditioning.

As in the case of the daylight factory, the historical truth of this technological advancement is that it occurred in stages, rather than in a single flash of inspiration. Wright's incorporation of these new ventilation elements was certainly a great leap forward in the history of these systems, but it may be too simple to pinpoint this moment as the origin of air conditioning. In her history of this invention, Margaret Ingels wrote, "the 1902 installation [at the Sackett-Wilhems Lithographing and Publishing Company] marked the birth of the air conditioning industry."[98] Yet Willis Carrier did not file U.S. patent No. 808897 for his invention until 1906, which he called "Apparatus for Treating Air." This series of dates suggests that, like much of history, the history of air conditioning is messier than many initially believe at first glance. Despite the refusal to be neatly categorized and defined, this invention is marked through a number of architectural advancements. Wright's building is the most readily recognized, but it is also essential to note that the Palace of Light, like the Armour building and Sackett-Wilhems, featured earlier incarnations of a similar system, predated his design by several years. If defined purely as a dehumidifying system, the byproduct effect of which is often a cooler temperature, then Wright's air conditioning system was certainly preceded by several other buildings at the turn of the twentieth century.

Perhaps the most essential aspect of this air conditioning history is its impact on the history of architecture. Banham suggested that architectural historians should "not become mesmerized by the technological innovations that went into its creation."[99] Instead, he offers, we can view Wright's building as a "bridge" between "the history of modern architecture as commonly written and a history of modern architecture understood as the progress of creating human environments."[100] If we examine the evolution of ventilation systems and air conditioning with a broader cultural perspective, the Palace of Light and Wright's building were both significant steps towards recognizing architecture as an instrument of human welfare. Rather than "becoming mesmerized" by the technological footnotes that attempt to pinpoint the precise moment of invention, the history of climate control in these two structures can illuminate a fundamental era of architectural history: one in which the modern inhabitant's comfort and health, as well as production profits, was at the forefront of the architect's concerns. These buildings did far more than make people comfortable; they synthesized exterior design with interior climate control, each in their own way. By taking into account the functional relationship between fresh air and interior air, they created buildings that exhibited new formal relationships between inside and outside.

Cleaning Spaces

The Palace of Light exhibited the company's commitment to hygiene throughout the interior of the building. As the company made sure to demonstrate in all of its publications, advertisements, and tours, the cleanliness of the manufacturing process attested to the cleanliness of the product, touching on food safety issues as well as laborer welfare issues. Bold statements about the factory's cleanliness were present on nearly every postcard and pamphlet, as Figure 7 describes the Natural Food Conservatory as "the cleanest, finest, most hygienic food factory in the world." Claims like this were supported by images of factory amenities, as well as explanations of the hygienic, mechanical methods of production that occurred inside. Detailed, lengthy narratives of the exact process used to make Shredded Wheat were used to familiarize the customer with these seemingly exotic machines. Step by step, readers were taken on a virtual journey through the factory in an effort to make the cleanliness of the production process transparent and, therefore, trustworthy.

The emphasis placed on cleanliness and purity, along with efforts to elucidate the production process, was in part a reflection of its historical context, working amidst the increasingly popular concerns of the Pure Food movement. The public desire for industrial transparency was intensified at the turn of the twentieth century. In both their corporations and their food, American citizens demanded knowledge of its origins. The quest for pure food led to an increased interest in the methods of industrial production. In order to meet these consumer demands while also manipulating them, corporate advertisements, pamphlets and factory tours emerged. Providing an odd combination of scientific facts and company promotions, this media gave skewed nutrition advice and simultaneously testified to the wholesome qualities of industrial food products.

In the early twentieth century, the Pure Food and Drug Act (PFDA) identified several concerns characterizing the public's relationship to industrial food production.

Although the PFDA was not passed until 1906, the legislation marked several decades of public and private interests lobbying for action. Amidst the growing presence of large-scale food production, the Pure Food movement attempted to make sense of the numerous, rapid changes to the way that food was made, purchased and consumed in the industrial era. The PFDA was the first in a long line of legislation that later led to the establishment of the U.S. Food and Drug Administration (FDA). Essentially, the PFDA was a labeling law. It instituted the federal regulation of food additives and the compulsory labeling of ingredients, and in doing so it sought to distinguish domestic food and medicinal products that were safe for public consumption. The law defined 'misbranding' and 'adulteration' for the first time in national food legislation, serving as an important moment in the ancestry of similar concerns for food labeling and modified industrial food products today.

The late nineteenth century was a time when many new discoveries were being made in the field of food science. Germ theory was now widely accepted by the public, and proper sanitation was a prominent concern. Research was advancing exponentially, but scientists and popular public figures were still divided on the proper proportion of protein in the diet. Wesleyan chemist Wilbur Atwater conducted research that led to a better understanding of the calorie and human metabolism. This early research led him to recommend that the average man aim for a daily total of 3500 calories a day and 125 grams of protein, whereas the Yale physiologist Russell Chittenden recommended roughly half that amount.[101] Conflicting research appeared in scientific journals ranging from *Popular Science* to the *Journal of Nutrition*, and these debates gained speed at influential conferences in Lake Placid and the Chautauqua Institution. Exacerbated by corporately funded advertisements, nutrition 'manuals,' and recipe books, the public was left to sort out these debates for themselves, with little guidance or education in the matter.

Muckraking journalists provided more fuel for the fire, drawing public attention to the increasingly questionable origins of their food. Public catastrophes such as the 1898 embalmed beef scare amongst American soldiers in Cuba, pervasive evidence of drug adulteration, and most prominently, Upton Sinclair's release of *The Jungle* in 1906 enabled journalists to bring this issue to the forefront of national public concern. Women's groups, temperance groups, health gurus and diet faddists all contributed to the cause, demanding more scientific research and government legislation in order to examine the impact of industry on food and drug production.

Complicating these issues were the political strings attached to each source of scientific research funding. Although the Pure Food and Drug Act eventually became government legislation aimed at protecting the public, its origins trace back to a combination of privately funded interests, muckraking journalists, and government affiliated researchers. Even the latter were occasionally effected by the wealth of large industrial food corporations, blurring the lines between scientific findings and influential funding. The career of Dr. Harvey W. Wiley, chief chemist of the U.S. Department of Agriculture, reveals some of the tensions he faced as a central figure in the fight for the Pure Food and Drug Act. Other scholars have written far more about his lengthy career,[102] which occupies a tentative position at the crux of science and politics. His early research on the impact of sugar, and his later work investigating food adulteration with the 'Poison Squad' each contributed to the eventual establishment of the PFDA.

Throughout his fight to obtain this important legislation, however, Wiley often found himself torn between appeasing large industrial food corporations and revealing some of the harmful practices he believed they used. On the other hand, his cooperation with the Heinz Company was perhaps the final push to pass the PFDA. By demonstrating the support of the PFDA, Heinz made a critical move to aid Wiley in these efforts, which also made an excellent publicity stunt for the company's products.

Although in some ways the Pure Food movement was a reaction to the growing influence of industrial food corporations and their freedom from government regulation, the PFDA eventually ended up benefitting the reigning oligarchy of a few large food companies. Heinz was quick to anticipate this effect, and therefore joined Wiley's crusade to establish the Act. In doing so, Heinz, and the other large corporations that followed his example, used the government regulations to their commercial benefit. Heinz recognized that smaller local food companies would be unable to financially keep up with the federal requirements, thus eventually driving them out of business. Historian Jim Powell recognized this system, reflecting "Early 'pure food' laws were aimed more at protecting producers than at protecting the general public."[103] With this competition eliminated, the PFDA would pave the way for a few large corporations and conglomerates to effectively dominate the market, driving costs down and thus allowing for expansion.

In response to these developments, the Shredded Wheat Company constantly emphasized the purity of their products in multiple ways. Even years before the PFDA was put into place, Perky had been expressing his devotion to natural foods, wholesome ingredients and hygienic processes. The company consistently aligned itself with the values of the Pure Food movement through a series of advertisements, as well as ranging the architectural design of the Palace of Light itself. This careful construction of corporate identity was pervasive, and thus it operated within the context of the growing industrial food sector. The late nineteenth century had seen massive strides in industrial food production, in terms of both technological developments and corporate policies. During this era, the Shredded Wheat Company was just one of many companies that were looking to assuage the public about the healthy qualities of a product in order to capitalize on this new economic opportunity.

By the time Perky first opened the doors of the Palace of Light at Niagara Falls, the food processing industry accounted for about twenty percent of the nation's manufacturing.[104] Several technological advances led to this boom in industrial food production, and the sector was poised to fundamentally alter the ways in which the nation ate by the end of the nineteenth century. Advances in canning, refrigeration and transportation, combined with an increased presence in advertisements, greatly impacted both the development and distribution of America's food. By the late nineteenth century, an intricate railway system and the newly developed refrigerated railway car enabled perishable products to be shipped across the country. This created a shift away from the previous dependence on local merchants, providing access to new, seemingly exotic items while also opening up the national market. Larger food companies, even though they were further away from home, began to outsell more local enterprises. This, combined with the industrial use of lower wage labor and new mechanical production methods, enabled larger corporations to drive their costs down, outpricing many local, smaller businesses. Armed with expensive, catchy advertising campaigns, corporations such as Heinz and Nabisco became recognizable brands in every home, coast to coast. By the turn of the century, large corporations dominated each of the top four sectors of the food industry- meatpacking, flour milling, sugar refining, and baking.[105]

As in other sectors, technological advances propelled the baking industry forward in great strides. In 1898, the National Biscuit Company (later Nabisco) debuted their new Uneeda Biscuit product inside 'In-Er Seal' packaging, with instant success. Designed to keep biscuits dry and safe from contamination, the sealed wax paper pouch inside the cardboard biscuit box revolutionized the way the industry sold and distributed its products. Previously, biscuits had been kept in a cracker barrel inside general stores, requiring customers to fill their own bags with the bulk product. These unfavorable conditions often led to biscuit deterioration, as older biscuits would crumble and rot as they fell towards the bottom when new biscuits were added on top. This was avoided with the invention of the In-Er Seal, allowing companies to serve customers in individual portions, keep biscuits fresh longer, and ship products across greater distances.

This ready-made revolution occurred in the context of the Pure Food movement, and the history of the modern breakfast industry exemplifies the rapid developments of this economic sector and its impact on the daily lives of the American populace. Innovations in the packaging, processing and shipping of these products enabled the food industry to transform the American breakfast into one that centered on three main concepts: convenience, hygiene and health. Before this industrial transformation, breakfast usually consisted of meat, eggs or porridge. Cooking breakfast required significant preparation time, which often included making a fire in the wood stove, frying meat, and stirring porridge. Of all of the daily meals, breakfast perhaps most often indicated economic class. Those who worked early in the morning tended to eat breakfast after a few hours of chores, and the privileged class tended to rise later and eat a meal prepared for them by the help.[106] The shift away from meat and towards grains was not only rare, but also more convenient. Rising from the health concerns of the Clean Living movement and Pure Food movement, the shift towards eating less, and eating less meat in particular, had a large impact on the typical American breakfast. Combined with the popular nutritional advice given from nineteenth-century vegetarian health figures like Sylvester Graham and later, John H. Kellogg, the food industry promoted a significant shift in the meal. Food historian Harvey Levenstein attests to this impressive feat, stating,

> Historically, industrial and economic development has been accompanied by the substitution of meat for grain in the diet. Yet...the breakfast food manufacturers managed to promote the opposite process at breakfast: the replacement of the traditional slabs of meat with various forms of highly processed grain.[107]

By the turn of the twentieth century, the breakfast industry capitalized on this convenient packaging, minimal preparation requirements and popular health concerns in order to radically transform the way Americans ate and purchased food. Industrial food factories like the Palace of Light were at the heart of this transformation, enabling these new packaged foods to be produced and consumed on a massive scale.

The Palace of Light was designed within the context of the Pure Food movement and the public concerns it raised regarding cleanliness, and images of the factory were reproduced in advertisements in ways that attempted to address some of these concerns. Advertisements placed in *Harper's Weekly* and *Factory* described each stage of the production line, attempting to elucidate the otherwise mysterious manufacturing process.

Narratives tended to combine a friendly introduction to a highly technical machine with a brief scientific explanation as to why that step is important for product quality, attempting to elucidate the process for the general reader. For instance, at the first cooking stage of the process, a company booklet aptly called *The Wonders of Niagara: Scenic and Industrial* not only indicates that the wheat is boiled for thirty-five minutes, but also explains why. It aims to educate the reader, stating, "the process breaks up the starch granules in the center of the wheat kernel, rendering them soluble and digestible. The outer coat of the wheat berry is unbroken and none of the nutritive elements of the wheat are lost in the process of cooking."[108] The prevalence of these descriptions, present in a range of publications both by and about the company, indicate a desire to make the complex mechanical undertaking of industrial food production seem not only simple, but also nutritionally wholesome. Partly explanation and partly advertisement, descriptions like these indicate the significant efforts that were made to illuminate the manufacturing process for customers.

Beyond simply explaining how Shredded Wheat is made, these narratives also emphasize the marvels of the modern industrial age. In much of this literature, this wonder takes the form of humanless machines. The absence of human hands is heralded as a benevolent force of cleanliness, and this form of sanitation is used to assuage any hygienic concerns associated with preparing food inside a factory. Countering public misgivings about the dirty conditions inside slaughterhouses and canning factories, the Shredded Wheat Company's promotional literature provided convincing arguments that a food factory can indeed be even *cleaner* than a home kitchen. A typical Triscuit advertisement from 1903 indicated "during the process of manufacture, it is not once touched by human hands."[109] This proud statement is echoed in many other advertisements, anchoring the claim for factory cleanliness in the modern transition to machines. Eliminating the possibility of contamination by any human impurities, these machines have provided a more sanitary solution. This type of advertising strategy suggests that industrial food production, when done correctly, is a superior, cleaner alternative to home cooking.

The Shredded Wheat Company was not alone in making this claim. Many food companies emphasized the minimization of human contact with their products, including Heinz and Franco-American. Nearby, the Larkin Company repeatedly demonstrated the purity of their products by emphasizing the lack of human contact made with the product during the manufacturing process. They boasted that their macaroni was "made by automatic machinery, and at no time are the materials ever touched by human hands."[110] Similarly, their baking powder was advertised as pure, because "Machinery is used throughout the whole process of manufacture...and the powder is not touched by hand."[111] Not just the products themselves, but even the transportation of materials during the production process was celebrated for this quality, stating "The transportation [of the soap carton] from building to building is entirely automatic, and the carton is not touched by hands during the journey."[112] Marveling at these automated machines, an imaginary narrator in a company pamphlet echoes the true motivations of these claims, "After seeing these dainty articles made at such reasonable prices, it seems foolish for any woman to make them by hand."[113] The prevalence of these statements indicates a thorough transition from pre-industrial food preparation at home to the industrial production of food in factories. Machines were not only welcomed into the factory, but they were also seen as a hygienic improvement to human error and contamination. In this new era of industrial technology, making food by hand was seen as not only unsanitary, but also simply outdated.

Automated machines provided a new vision of industrial labor that implied both benefits and consequences. Whether as the harbingers of a new dawn or a new doom, machines illustrated the potentials and perils of a hands-free world. Some celebrated the capacity of machines to free man from menial work, allowing them to engage in more intellectual pursuits. An article in one popular magazine, *The World's Work*, rejoiced in these aspects:

> The time seems near when men will no longer need to do anything with their hands as instruments of strength...In the ideal completeness of this adaptation of machinery, man will be emancipated from mere muscular labor and have his hands and time free to form only the tasks of skill...This is a revolutionary step in human history.[114]

From this perspective, machines act as instruments of liberty. By taking over the physically difficult or menial tasks of industrial production, some believed machines would allow humans to embark on a new enlightenment, engaging in more meaningful pursuits with their leisure time. Curiously, this narrative also hints at an element of craftsmanship, evoking associations with the Roycroft Movement. Even at the height of industrial technology, machines could ironically enable a return to the values of that movement, allowing humans to practice specialized skills rather than pure mechanical reproductions. Intrinsically connected, mechanized production and individualized craftsmanship were interdependently related as the American public continually renegotiated the roles that each would have in their newly industrial existence.

Envisioning a more distant future, early twentieth-century science fiction also illuminated some of the cultural issues surrounding machines during this industrial era. Materializing some of the public concerns over mechanized industrialization, E.M. Forster prophesized a future world that is not entirely unlike our own today. In "The Machine Stops (1909)," Forster described a world in which people communicated solely over handheld devices, which are eerily similar to today's smartphones. With a populace mortally afraid of contamination, the quest for hygiene had reached extreme levels as everyone lived entirely in their own mechanized quarters underground. All human life was intricately tied to 'the Machine,' as it provided all the daily necessities for food, sleep and entertainment. Burrowed underground due to an unexplained environmental disaster on the Earth's surface, this society worshipped the Machine to nearly religious proportions, sharing their sermons over a globalized communications network that is much like the internet. Forster's story is not only striking for its predictive visions of today's technological devices, but also because it illustrates some of the most popular early twentieth-century concerns over the rise of mechanized industry. By amplifying the early presence of technology to an extreme future, Forster depicted the complicated relationship to machines in his own time. The modern marvel of machines is coupled with a warning about the risk of human dependence on them, reflecting concerns that humans will place too much power into mechanical hands at their own peril.

The relationship between humans and machines was further complicated as industrialists applied new tactics to their publicity stunts. Several corporations portrayed machines as friendly rather than foreboding, attempting to demonstrate the benefits of machines while also downplaying their seemingly futuristic technologies. The Shredded Wheat Company even personified some of their machines, humanizing them in order to demystify them to customers. In a 1913 pamphlet, the machines used to seal and package biscuits were simultaneously described as "marvels of mechanical ingenuity" and "almost human." It stated, "They impress the visitor as being 'almost human' in their operation as they automatically open the flaps of the cartons, cover them with dextrine [vegetable glue], fold them together again and then paste a strip of paper over each side...making a package that is practically moisture proof and air tight."[115]

The adjacent illustrations struggle to reconcile these humanized machines with mechanized humans. Figure 10 shows a page from *The Wonders of Niagara* (1916), in which two images are placed in juxtaposition. The layout conveys a delicate balance between human workers and industrial technology, working separately but in harmony. Providing a glimpse into the factory, the booklet provides several interior scenes of laborers and machines, although rarely in the same image. Close up views of machines, seen in the bottom left of this layout, tend to emphasize the metallic, skillful engineering of their design. In this particular image, pipes, beams and motors are abstracted into a geometric pattern that is hardly legible as a sealing machine. Depicted from a corner angle, the horizontal conveyor belt seems to stretch on for a great distance, hinting at the impressive scale of operations. Although the adjacent narrative described these machines as "almost human," here the caption enforced that they are "marvels of mechanical ingenuity." In what seems to be almost a mistake, a human worker is barely visible behind the machine. As if he accidentally stepped into the picture, he is nearly obscured by the machine in the upper left corner as a blur of white. His face is hidden, and with no particular identity, the viewer who notices him is reminded that humans are required to fix or aid the machines. Whether intentionally or by accident, we are reminded that this is not an entirely mechanical process after all.

While the bottom image anchors the industrial process in modern technology, the top image balances these marvels with a more familiar human element. Rows of female workers are photographed from a similar angle as the adjacent machine image, providing a visual consistency that unites the layout both aesthetically and conceptually. Their placement on the page, as well as their similar perspective, invites comparison between the two. At first glance they appear unrelated, but further analysis reveals them at opposite ends of the same equation. One 'almost human' machine can do the labor of several workers, and the layout exhibits both of these factors as equally important to the manufacturing process. Machines have been elevated to work side by side with humans, an impressive feat for a new technology.

While this juxtaposition celebrates machines, it also reinforces the importance of people. Their highly organized lines, in a clean, predominantly white factory setting, indicate they can be mechanically productive as well. But human elements- their bonnets, individual faces and seemingly calm disposition- remind the viewer that women are an irreplaceable labor force in making this product. Marchand, discussing similar visual techniques by other industrial corporations, suggested that these images "seemed to guarantee that a real person, with his identity publicized and his reputation thus placed on the line, stood behind the product."[116] Placing these images together through visual techniques of composition, juxtaposition, and layout, corporate brochures like this one attempted to reconcile this complex relationship by humanizing machines and mechanizing humans. The image of a highly mechanized factory extended beyond the architecture itself, and into the human body.

Industrial food corporations frequently equated the body to a machine, providing a combination of nutritional advice and product advertisements. Although this concept was popular during the modern industrial revolution, the metaphor emerged in the seventeenth century, during the scientific revolution. Descartes is often credited with the first major treatment of the body as a machine, particularly in his *Traite d'Homme* (*Treatise of Man)*, published posthumously in 1648. The concept of a mechanized body also appeared in early Greek texts by Aristotle, but this way of thinking perhaps only became central during Descartes' time. Describing the body as an entity that could perform basic, automatic functions independent of the soul, Descartes established the body-as-machine metaphor for subsequent centuries of thought. The early twentieth century renewed the use of this comparison, particularly on the heels of a more sophisticated understanding of calories. Scientists such as Wilbur Atwater developed more precise ways to measure the calories and nutritional content of foods, in conjunction with calorie expenditure through exercise, reviving an interest in the body as machine. Translating these discoveries into nutritional advice for the general public, scientists, industrialists and advertisers compared the body to a machine with new vigor and varying degrees of accuracy.

The notion of food as fuel was particularly popular with early twentieth-century food corporations, providing an excellent promotional vehicle to combine the mechanized productions of the factory with the mass consumption of industrial products.

In a self-published cookbook, the Larkin Company employed the metaphor to emphasize the purity of its products:

> The comparison of the body- the living physical machine- to a locomotive is an old one, but let us use it again...The man in control of the engine knows that a coal free from dirt and slate makes a hotter fire, generating more energy with less wear upon the machine itself...These same things are true with the human machine- food, the fuel, should be chosen with still greater care. In these days of adulterations, it is not always easy for the housekeeper, without a knowledge of chemistry, to know when she is getting a pure food. There is one great remedy for this- buy your supplies from a firm in whom your confidence is well placed.[117]

Combining the concerns of the Pure Food movement with mechanical imagery, testimonials like this one attempt to reconcile the impact of machines with a simultaneous desire to eat healthy, clean, natural food. By merging the image of man and machine, the concept of consuming food made in a factory seems more logical and familiar to consumers. The Shredded Wheat Company frequently utilized this advertising tactic, stating "Now, there is but one way of increasing the manpower of the human machine, and that is through proper food and rational exercise...So, with the human engine, what kind of fuel should we put under the boiler?"[118] The answer, of course, is the company's Shredded Wheat. Using the metaphor of the body as a machine was particularly well suited for industrial food corporations. Not only was the metaphor already somewhat familiar to customers, but it also provided a line of logic that naturally culminated in the production of food by machines. In order to fuel a mechanical body in the industrial era, it now seemed almost obvious to fuel it through food made predominantly by machines, rather than human hands.

This corporate insistence upon cleanliness was evident in the Palace of Light itself. Several architectural elements were aimed at ensuring the utmost cleanliness for the factory, addressing some common public fears about food sanitation that arose during the Pure Food movement. Wherever human hands must be involved, the factory provided several opportunities for washing them. The Shredded Wheat Company went to great lengths to install costly and luxurious bathing facilities for the employees, demonstrating the importance placed on personal hygiene (Figure 11). Employees were allotted one hour a week for cleaning themselves in any of the lavish locker rooms, thirteen showers, twelve bathtubs, seven sponge baths and 104 sinks, complete with complimentary soaps, fresh towels and bathroom attendants. Although several other large companies were installing similar services for employee cleanliness, the Shredded Wheat Company was nationally praised for its thorough amenities. An article in *Engineering Magazine* provided specific suggestions for employers to install bathing facilities into their factories, suggesting the practices used by the Shredded Wheat Company as "an ideal arrangement."[119] White fixtures, tiled floors, and marble surfaces were among the suggestions to enable clean bathroom practices, which would easily reveal dirt for faster cleaning of both the room and the person using it.

Conversely, these architectural trends towards enabling cleanliness and personal hygiene were occurring in domestic settings as well as in factory buildings. Scholars Ellen Lupton and J. Abbott Miller examined this phenomenon in *The Bathroom, The Kitchen and the Aesthetics of Waste,* suggesting that the evolution of these rooms in both houses and factories may have been more interrelated than they initially appear. Not only were the kitchen and the bathroom absorbing new technologies and transformations in the early twentieth century, but these two rooms were becoming increasingly prominent in corporate industrial architecture as well. At the Palace of Light, for instance, the employee bathrooms were featured in many of the company's advertisements and tours as evidence of the factory's cleanliness and hygienic policies. The use of new materials, layouts and fixtures at this time popularized "The hard, white porcelain bathroom which rendered dust and grime immediately visible...with unornamented surfaces impervious to dirt and moisture."[120] In both the factory and the home, bathrooms were one of the first rooms to fully convey this new "aesthetic of obsessive cleanliness" which soon spread to other rooms and building types.[121]

Around the same time, American homes were reinventing their kitchens, incorporating new mass-produced appliances, plumbing capacities, and layouts in order to create more efficient spaces. These transformations occurred primarily in middle and upper class homes, where a new group of consumers were the primary targets of corporate efforts. While the working class was generally excluded from the financial privilege of these home renovations, the middle and upper classes increasingly focused their efforts on purchasing expensive new appliances, floors and cabinets that would supposedly improve efficiency inside the home. Companies focused their advertising primarily on middle and upper class consumers, particularly females, in order to demonstrate the ways in which these new technologies could improve their lives at home. Emphasizing efficiency, cleanliness and technological sophistication, companies presented these appliances and kitchen designs as essential items to be used for ushering in a better lifestyle for consumers. Extending these concepts even further, some middle and upper class women also began to view these new designs as potential tools for social reform. As culinary historian Laura Shapiro has observed, "What chiefly excited these women- an inquisitive circle of ambitious cooks, teachers, writers and housekeepers- was the link they perceived between science and the world they knew best, the link between science and housework."[122] Using these industrial approaches to home kitchen renovations, these women "really wanted was access to the modern world, the world of science, technology, and rationality, and they believed the best way for women to gain that access was to recreate man's world in the woman's sphere."[123] By purchasing and promoting products intended to streamline the domestic approach to productivity, both industrial companies and domestic consumers re-envisioned the kitchen as a place for modernizing American daily life.

Although they seemed to operate at opposite ends of the spectrum, the kitchen and the factory were closely intertwined in the cyclical process of mass-production and consumption that began dominating American economic behavior in the late nineteenth and early twentieth centuries. During this time, Lupton and Miller demonstrated, "The modern kitchen emulated the unforgiving sparkle of the bathroom; it also reflected the production ideal of the modern factory, whose linear sequence of work stations enabled an unbroken flow of activity."[124] Evidenced years later in Margarete Schutte-Lihotzky's Frankfurt kitchen, this industrial, Taylorist approach to domestic kitchen design reflected a porous stream of influence between factory architecture and domestic aims. Rather than at an actual factory, however, "the labor performed in this [domestic] factory centers around consumption rather than production."[125] This unbroken flow strongly resembled a miniaturized factory within the home, often designed with an open uninterrupted space situated in precise proximity to required appliances in order to minimize movement and maximize efficiency.

As architectural spaces that were both closely associated with food, the kitchen and the factory also took design cues from one another at this time. Lupton and Miller examined the ways in which, "Changes in kitchen design were preceded by the rise of food packaging...where a food package encloses the product, resists dirt, air and moisture, sealing off the product within, so too did the shells of the modern kitchen."[126] Developed primarily by the breakfast cereal industry, including Perky himself, this packaging played a significant role in convincing consumers that industrial food products were hygienic, long lasting, and trustworthy. The Shredded Wheat Company played a significant role in this process, promoting its packaged products and constructing a factory that embodied those same industrial values of sealed, hygienic food. Simultaneously, these new industrial values were absorbed not only into the white brick walls of the factory that produced them, but also into the home kitchens of the people who consumed them. New forms of factory food production were therefore accompanied by new spaces for their home consumption, and the domestic kitchen and the industrial food factory were both increasingly equipped with architectural components that served as 'spatial' packaging that echoed these new products. "Like its grain silos and factories," Lupton and Miller argued, "America's kitchens and bathrooms at the turn of the century presented an image of unfettered modernity, often idealized as a spontaneous evolution of pure functionalist design."[127] White surfaces, tiled floors, porcelain fixtures and open layouts arranged in proximity to machines were just a few of these methods that could be seen both at the Shredded Wheat factory and in houses across America at this time. In this sense, the industrial factory and the domestic kitchen were similarly packaged as efficient, hygienic, self-contained units that serviced the modern cycle of production and consumption.

Worker Spaces

The architectural components designed to enhance the factory's cleanliness and comfort was loaded with positive promotional value, advertising not only the company's hygienic practices, but also its benevolence towards employees. The Shredded Wheat Company spoke widely on the subject of employee welfare, ensuring that not only potential employees but also the general consumer public was well aware of these practices. In a self-published booklet, the company boasted that its "regard for their welfare does not end with perfect sanitation, perfect lighting, and elevating surroundings. It carries on varied departments of welfare work that are calculated to promote moral and educational betterment as well as health. With unstinted generosity the company provides opportunities for mental, manual, artistic and social development."[128] In an era of public skepticism about the emerging impacts of factory work on laborers, industrial corporations like the Shredded Wheat Company made sure to prove their influence on workers was purely positive.

Beginning in the late nineteenth century, employee welfare initiatives, or welfare work, became an essential component of corporate development. The National Cash Register Company (NCR) in Dayton, Ohio is generally credited with some of the first initiatives in welfare work, installing programs and facilities for laborers as early as the 1890's. NCR provided amenities such as baths and lunchrooms, as well as programmatic benefits such as team sports, dance lessons and a company newsletter. Although these offerings were of a substantial cost to the company, NCR operated under the belief that better treatment of employees would lead to a better, more consistent product, and thus a larger profit. This diversity of employee opportunities, later labeled under the term 'welfare work,' soon attracted national attention, and companies such as International Harvester, Sherwin Williams, and Westinghouse Electric began to provide similar offerings.

The corporate motivations for welfare work suggest a complex mixture of economic, social and promotional factors. Labor historian Andrea Tone, in her excellent study of welfare work in *The Business of Benevolence*, insisted that profit was the bottom line for industries that offered these programs. She wrote, "Employers adopted welfare work because they believed that for a variety of reasons, sympathy within the workplace paid."[129] That variety of reasons, however, ranges from actual considerations over employee health to more Machiavellian applications of their productivity. Overall profit was indeed the largest incentive to adopt welfare work programs, evidenced by the large amount of corporations who did so during the first few decades of the twentieth century. Although NCR spent about three percent of its annual payroll on welfare programs- about $45,000- these efforts yielded an estimated profit of about five to ten percent.[130] By providing amenities that enabled employees to exhibit a higher standard of physical and mental health, welfare programs greatly reduced the number of worker accidents, sick days, and employee turnover. Investing in welfare work was, in a sense, investing in the consistency and productivity of factory workers. Far more factors were involved beyond an actual concern over the well being of workers, and corporations also expected a return on this investment.

The darker side of welfare work reveals elements of corporate control, distrust and elitism, although the reality may have been more of a gray area. Public displays of employer benevolence naturally invited skepticism as to the true motivations and consequences of welfare work. Although many laborers would have likely preferred a higher wage in place of a shower at work, corporate insistence on these programs suggested ulterior motives that may have been beyond merely financial profit. Rather than giving laborers a higher wage so they could install baths in their own homes, providing bathing facilities at work introduced an element of control over the private lives of employees- a theme that was present in many aspects of welfare work.

With the rise of increasing leisure time and opportunities, an overall distrust of how employees spent their time outside of work influenced the implementation of welfare programs. In order to discourage workers from going to saloons, dance halls and brothels, employers provided healthier alternatives for leisure activities. Rather than engaging in frowned upon activities such as drinking and promiscuity, which could also lead to employee absenteeism or sickness, companies encouraged workers to instead participate in the wholesome activities they provided at work. While for some this was a welcome benefit, for many this appeared to be a form of nearly mandatory control, manipulating not only citizens' daily working life, but also their private lives as well. Unionists such as Annie Marion MacLean warned workers of these consequences, stating:

> The employer who installs shower baths, and then with a blare of trumpets...calls his goodness to the attention of the passer-by, belongs to the same class as a circus manager who exploits the tricks of his animals, not because he poses as the savior of the animal creation, but because he hopes it will induce money to flow. We must, then, make a clear

> line of demarcation between the schemes of an enterprising publicity agent and genuine purposeful betterment work.[131]

Skepticism surrounded these employer initiatives, and rightly so. Public displays of corporate benevolence flooded popular magazines, company pamphlets and a wide range of advertisements. While some laborers and consumers viewed these displays as evidence of positive policies, figures like MacLean wondered if these programs were exhibited as part of more defensive measures.

At a time when public opinion of factory conditions was decidedly mixed, industrial corporations vigorously promoted the benevolent aspects of their programs. The rapid dominance of the national food market by a few large corporations represented a major change in the average consumer's relationship with merchants. Although customers previously placed great trust in their local merchants when choosing their products, the rise of massive industrial food companies presented a broader national market of brand names. No longer connected in any direct way to the product they were buying, consumer culture was often unsettled by the impersonal process. Combined with the efforts of muckraking journalists and unionists, some customers were justifiably apprehensive about purchasing food that may have been made far away, in mass quantities and in seemingly shameful factory conditions.

The image of the 'soulless corporation' gained speed at this time, and several companies were quick to counter this depiction with lavish displays of their employee benefits, sanitary conditions and laudable factory architecture. In this expansive, competitive national market, "employers made welfare work a key component of product marketing."[132] Not only did this advertising tactic distinguish a company as more benevolent than its peers, but it also imbued the product with a sense of social purpose.

With many similar products on the market, corporations like Heinz emphasized their own excellent employee conditions as a way of distinguishing their pickles as superior to the nearly identical ones on the adjacent shelf. Advertisements depicted welfare work as a way to guide the savvy shopper in making these decisions, thereby "acknowledging the existence of the educated, discriminating consumer who took into account the conditions under which products were assembled before making a purchase."[133] In what became a veritable war of advertising campaigns, industrial food producers went to great lengths to provide evidence that their practices were even more benevolent than their competitors.' By demonstrating these conditions, these promotions imbued the product with the supposedly positive energy of employees, rather than their discomfort. If the product was made with something close to love, than to buy that product would not only be a vote in support of welfare practices, but also an act of consuming that love itself.

Architectural improvements were central to promoting industrial benevolence, and corporations took several steps to convey a cohesive message through both programs and physical amenities. Employee activities, clubs and classes were popular ways of reinforcing societal ideals, and the Shredded Wheat Company was just one of many corporations that provided these welfare programs. Under pressure from the ever-present public gaze, trade journals insisted "It is not sufficient to think simply of the physical wants...it is necessary to afford the work people opportunities for mental training and mental growth."[134] By the early twentieth century, large industrial companies offered such a diverse range of these opportunities that it quickly became an escalating competition to prove that their corporate benevolence was better than their competitor's.

Although these programs were more ephemeral than some of the more tangible architectural improvements, this kind of welfare work was often advertised by means of architecture as well. The Shredded Wheat Company often featured its factory architecture as an advertisement for its less tangible programmatic activities for employees. One company pamphlet insisted that they have "not only provided a beautiful place for its employees to work in, but has in operation probably the most rational scheme of social and moral betterment that may be found in any factory in this country."[135] Continually returning to factory design as the foundation for these social offerings, the pamphlet advertised that company regard for employees "does not end with perfect sanitation, perfect lighting, and elevating surroundings. With unstinted generosity, it carries in varied departments of welfare work...opportunities for mental, manual, artistic and social development."[136] As a more photogenic entity, factory architecture provided the most convincing visual evidence of these less tangible welfare programs. Even whilst promoting the company's classes, activities and recreational offerings, advertisements illustrated these benefits through their physical embodiment in brick and mortar.

As a result, architectural plans and images today serve as some of the best archival evidence of these more ephemeral welfare programs. Corporate attempts to socially educate and regulate employees can be studied through the accompanying spatial amenities that these activities required. Interior images of factory lunch rooms, resting rooms, lavatories and libraries appeared in advertisements and trade journals, as corporations used these luxurious spaces as visual evidence of their programmatic benevolence. The spaces that hosted these employee activities for recreation and edification thus came to physically embody employers' social efforts to improve labor conditions. Furthermore, architectural images served as 'proof' to distant viewers, translating something as intangible as benevolence into something both physical and visual. In this sense, factory architecture serves as a microcosmic clue, providing insight into the broader sociocultural influences impacting early twentieth-century industrial welfare policies. The architectural arrangement of these factory spaces hint at various attempts to socially educate and 'improve' employees for both a better corporate image and increased profit. Although many of these welfare programs no longer exist today, they can be traced through a series of rooms embedded in the factory design itself.

Evidence of these spaces is somewhat limited, and therefore the organizational structure of this portion of the chapter will differ from the preceding sections. Where other areas of this chapter tend to discuss the Palace of Light and the Larkin Administration Building separately, the 'Worker Spaces' section that follows will often examine these buildings side by side. Intermingling these two examples of worker spaces will create more direct comparisons, often examining the same type of space at both buildings simultaneously. As there is a more limited amount of material available on spaces designed primarily for workers at these factories, this discussion merges the Palace of Light and the Larkin Administration Building together more so than in other areas of the chapter. The relative absence of worker narratives, images and description is these spaces also serves as evidence in itself, revealing the prioritization of top-down approaches to architectural design and corporate policies at industrial factories that is unfortunately persistent in the archives today.

The industrial factory came to represent not only corporate identity and employer policy, but also the health of employees themselves. Elegant baths, comfortable resting areas, and pristine assembly lines were believed to improve employee health, and this was particularly beneficial for improving the company's product as well. Tone asserted that, to these corporations, "factory beautification was deemed as vital to employee performance as proper nutrition was to good health."[137] Advancing the metaphor of the body as machine, here the industrial food factory becomes an extension of human health. A healthy factory environment would create healthy employees, which in turn would result in a healthy food product, and would thus theoretically improve the health of any consumer who bought it. Beginning with the factory and trickling down to the consumer, architectural beautification was extremely instrumental in establishing and promoting this logic.

Resting Spaces

The obvious physical difficulties faced by factory workers inspired corporations to provide respite areas in order to mollify public concern over these conditions. Resting rooms provided a non-industrial image of an otherwise largely industrial place, and these spaces became a relatively common practice for corporations that employed women workers by the early twentieth century, including Heinz, NCR, Westinghouse Electric and International Harvester. In the Buffalo region, both the Larkin Company and the Shredded Wheat Company made space for this amenity in their factories, making a grand display their resting rooms in advertisements. Gender played a large role in the implementation of resting rooms, and they were often provided only for female use.

Attempting to shield women from physical hardships, these resting rooms coddled women and reflected early-twentieth-century perceptions of women as vulnerable and physically weak. Employee resting rooms provided a humanizing counterpoint to the prevalence of industrial machines, shifting the focus towards female bodies and away from the hazards of factory work. Photographs of resting rooms softened the public image of factories in corporate advertisements, often depicting elegant furnishings and plenty of light in order to assuage public concerns over the potentially negative influence of industrial labor on women's delicate bodies.

The Palace of Light featured a resting room (Figure 12) that the Shredded Wheat Company described as a "comfortable, cheerful, and sunlit" space for women to relax. Located adjacent to the women's dining room, the resting room included rocking chairs, solid oak tables, and a variety of reading materials and games. Furniture and entertainment were frequently emphasized as essential components of these rooms, and company pamphlets envisioned a lengthy post-meal period of relaxation before returning to work. One wrote, "After lunch the girls who choose to do so may lounge or visit in the comfortable rest room which is furnished with leather-upholstered furniture, settees and lounges, reading tables and a circulating library."[138]

The Shredded Wheat Company took pride in providing social guidance in the resting rooms for its female workers as well, reassuring families of these workers that these women would be in good care. The company boasted that "the physical and social welfare of the girls is largely in charge of a matron or 'factory mother' who is always ready with timely help and kindly suggestion to meet the troubles and perplexities peculiar to the sex."[139] The woman standing in the back of the room in Figure 12 may represent this ‘motherly’ figure, surveying the activities of women and ensuring their proper behavior and health. The practice was not uncommon in situations where women ventured outside the home, particularly in schools and workplaces. In a company largely run and owned by men, the factory matron provided guidance, or supervision, specific to that foreign concept of ‘femininity’ that men could not address.

Adjacent to this room was a first aid room, equipped with a hospital bed and emergency supplies. The Larkin Company also placed these two rooms together- resting rooms and first aid rooms- as did several other factories. Floor plans consistently depict these two rooms adjacently, suggesting the motivation for these resting areas was not for primarily recreational purposes, but instead for physical health. Rather than aiming to improve the mental health of female workers, resting rooms provided a buffer zone between everyday work and a more dangerous form of fatigue. In this sense, factory floor plans provide insight into the architectural messages sent to employees. Resting rooms were incorporated into designs not as an added benefit, but in order to prevent women from injuring themselves from overwork. The fact that they were provided solely to female employees only reinforced the gendering of space, implying that the physical constitution of women was inherently weaker than that of men.

While the majority of factory workers at the Palace of Light were women, the Larkin Company employed a more mixed set of workers. At the Palace of Light, female laborers tended to work in the packaging department, often dealing with the production and use of paper products such as boxes, cartons and advertisement printings. These tasks were generally light-industrial labor, and did not require lifting heavy equipment nor working in extremely hot, dusty or sooty conditions. Conversely, male workers at the

Palace of Light were segregated to other tasks, typically working on the production line for the shredded wheat itself in other portions of the building. Operating bulky machinery, lifting heavy loads and standing for long periods of time, male workers were assigned to more physically demanding departments at the Palace of Light.

Both companies made sure to physically separate men and women in their factories, evidenced in the architectural segregation of employee entrances and dining rooms. As at the Palace of Light, the delegation of tasks at the Larkin Administration Building fell along gendered lines. Where women were typically secretaries and administrative assistants, men were salesman, managers and desk clerks. Additionally, men were employed elsewhere in the Larkin complex, as they were typically engaged in the industrial operations of the nearby factory buildings where women rarely appeared. Similar to the division of industrial tasks at the Palace of Light, the Larkin Company placed men in positions that were more physically demanding, whereas women did appear occasionally in light-industrial positions such as in packaging or product labeling. The Larkin Company took additional steps to protect the integrity of women, providing a resting room as well as an entirely separate building devoted to female needs. Due to its more heterogeneous employee composition between the factories and the administration building, however, the Larkin Company made sure to provide additional amenities designed specifically for women. The mixed gender environment could be perceived as particularly threatening to the chastity and health of young women, and the Larkin Company thus took extra care to promote its careful consideration of gender. Notably, both companies produced significantly fewer images of male employees at work than of female employees, indicating the promotional aims that focused on featuring their treatment of women laborers.

Located near the Administration Building, the Women's Building, or Council House as it was later called, was a comparatively simple building that somewhat resembled a modest schoolhouse. Housing an auditorium for lectures as well, the front-gabled brick structure provided a separate space for women's amenities and activities, illustrating the use of gender specificity in the company's welfare work programming. The rooms included, as always, "ample space, good light and attractive furniture,"[140] but also a player piano, reading materials, and hospital beds. Former employee Janette Weide recalled the building in an oral history interview over eighty years later, as "the place where she learned to knit."[141] Supervised social activities and classes were offered to women, often reinforcing their domesticity and culturally appropriate behavior. The building also offered an alternative option to the basement cafeteria, as Weide described, "After work you would go to the Women's building, and you would have a very nice dinner, all buffet style, and it would be like twenty-five cents; and then you would stay for a lecture or your English class or your knitting or handiwork of any kind."[142] Communal activities such as eating and classes, as well as the women's fife and drum corps, encouraged a friendly social relationship amongst female employees. While men were encouraged to join the company's sports teams, women were encouraged to rest their weary bodies and learn domestic skills in the Council House. Enclosed within those walls, the Larkin Company attempted to preserve female dignity and improve these supposedly feminine skills through a variety of programmatic offerings.

At both the Larkin Administration Building and the Palace of Light, furniture played an integral role in reinforcing corporate agendas in these rooms. The material, ergonomic design and functionality of chairs and desks in both buildings indicates two distinct approaches to softening the industrial image of a factory. Furthermore, different styles of furniture appeared in different rooms, reflecting the image that designers wished to communicate to the intended audience of each space. While the Palace of Light featured comfortable wooden chairs built by Roycroft artisans, Wright designed furniture at the Larkin building out of a combination of industrially produced metal and leather. Particularly at the Larkin building, the placement of two kinds of furniture, one luxurious and one perfunctory, indicates a strategic approach to crafting a public image that contrasted to the private, employee spaces rarely seen by visitors. Taking a closer look at the design and placement of furniture throughout both factories provides insight into the role of interior design in softening the industrial image of these spaces.

In his characteristic fashion, Wright designed not only the Larkin Administration Building itself, but also the furniture to complete his vision of the spaces inside. The architect approached the task of designing office furniture in a somewhat individualized approach. Rather than simply providing one kind of desk and chair, Wright instead created a somewhat hierarchal series of office furniture. Designing three different types of desks and four different types of chairs, Wright's furniture demarcated employee status while also addressing the different functions of each type of work.

Wright designed desks and chairs for three types of workers: regular clerks, chief clerks, and executives. The regular clerk's desk formed the majority of the desks, with 1000 of this type reported to be in the building when it opened.[143] One observer described these desks as “flat top and built in simple, straightforward lines without elaborate ornamentation of any kind.”[144] Wright designed these desks with daily clerical tasks in mind, making the desktop heights adjustable so that they could be lowered when used for typewriters. Gramophones were also set within the desks, enabling clerks to dictate letters to clients and correspondents with ease. The desks were arranged in pairs facing another, enabling other pairs to join together in order to unite a department into an organized group of clerks working on similar tasks.

Rather than designing the clerks’ desks and chairs separately, Wright incorporated the chair directly into the design of the desk (Figure 13). On each desk, an armless, straight-back chair was attached to a pole that was supported at a perpendicular angle by the desk. Clerks were able to pivot on the chairs, turning from the desktops to typewriting stations as needed. At the end of each workday, the back of the chair would be folded down flat, and the entire chair unit would be pivoted into the desk, where the workers legs had previously been. One former employee recalled using the desk during her time as a clerk in the building, describing, “the back folded down over the seat and on a swivel could be turned underneath the desk at night when we left we always had to put our seat down and put it underneath the desk...And so the floors were all free.”[145] This came to be called the ‘swivel chair’ design, which, much like a cantilevered roof, left the floor completely open, since the chair was part of the desk rather than a freestanding unit with its own legs.

This interest in an uncluttered floor extended to the desktop surface itself, as company policy dictated that all desks must be completely cleared of work papers at the end of the day. Not only must the chairs be placed under the desk, but the desktops must also be emptied when work was done. One visitor described this quick process, stating, "In less than two minutes from the sounding of the time-gong every clerk's desk in the building may be absolutely cleared, leaving not so much as a scrap of paper in sight. Under such conditions the janitor with a vacuum cleaning apparatus makes short work of the day's accumulation of dust...papers going into one of the desk drawers, books and cards filed into the cabinets provided for them."[146] The Larkin Company's corporate emphasis on cleanliness and efficiency was both aided by and embedded within the design of this office furniture, which ensured a consistent appearance and practice for the numerous clerks that worked in the building.

Wright designed office furniture for higher-level workers with more distinctive features, often including some form of ornamentation or material variation in order to communicate their status. Chief clerks, for instance, worked at desks with swivel chairs much like regular clerks, but their desks were adorned with decorative panels of magnesite that matched the floor throughout the building. While the basic structure of the desk and chair were much the same as those for regular clerks, these small variations in furniture design communicated the chief clerk's slightly higher status. Chief clerks' desks were also typically placed at the ends of rows of regular clerks, and this arrangement further confirmed their hierarchical position.

Larkin Company executives received more elaborate desks, marking a design departure from both types of clerical desks. Rather than equipping them with the swivel chairs and attached desks, Wright designed freestanding chairs and desks for the executives. Figure 14 depicts the typical furniture and arrangement of an executive office at the Larkin Administration Building. Wright designed freestanding chairs with three legs on wheels, enabling the executive to away from the desk, a privilege he did not provide to the clerks with attached chairs. The chairs each featured two arms, another privilege not provided to clerks, enabling both comfort and an authoritative posture. While clerks received solid, straight-backed chairs, the executives instead received some ornamental detail in a punched out geometric pattern on the back. The desks were clustered together in a similar formation as the clerks, yet were located in a private office rather than on the shared main floor seen towards the left side of the image. Wright's furniture designs, coupled with the arrangement and location of the items, provided varying degrees of comfort, an efficient use of space, and visual cues as to a worker's status.

Despite their varied designs, all of the Larkin office furniture was made from the same metal material, with small leather cushions embedded in the chairs as wells. All the chairs and desks were made of a folded and punched sheet steel, which somewhat resembled the steel skeleton beams of a skyscraper building. This metal was an uncommon choice for furniture in 1906, reflecting Wright's careful consideration of its material qualities as well as his bold design. Responding to John Larkin's significant concern for creating a fireproof building, Wright created metal desks and chairs in order to prevent the threat of destruction. Furthermore, Wright took pride in the ability to clean the desks swiftly with vacuums, which was aided at least in part by their metal qualities.

Aside from these practical advantages, however, Wright likely employed this metal material for aesthetic reasons. Cut from sheets of steel, the furniture conveyed an industrial quality, one that was inherently modern. While the Administration Building primarily housed office spaces, the industrial steel furniture provided a reference to the larger Larkin Company complex, placing the building in the broader context of the industrial processes that occurred in nearby buildings. Industrially produced metal appeared in architect-designed furniture, merging a mass-produced aesthetic with a highly individualized vision. The Administration Building's status as a white-collar office space enabled Wright to gesture towards this broader function of the Larkin Company complex without committing the entire office building to purely industrial design.

While the incorporation of industrial steel into office furniture may have been conceptually successful, the execution of its design was not always well received by workers. The weight and function of the chairs created numerous issues for the building and the company, suggesting that Wright may have valued their appearance more so than their function. Each of the freestanding four-legged office chairs Wright designed for Larkin executives, for instance, weighed sixty-seven pounds.[147] Over time, this substantial weight impacted the building's magnesite floors, which provided an attractive, smooth surface but soon chipped and cracked under the weight of the freestanding metal chairs.

Several employees complained of their discomfort in the swivel chairs, provoking a series of anxious statements from the Larkin executives that came to a peak around 1913-1914. Many clerks wrote notices to the executives regarding the uncomfortable chairs, threatening to bring in their own wooden ones. Chief clerk Mr. W.N. Whitney, for instance, notified the executives in March 1914, "I would appreciate being allowed to buy a wooden swivel chair...I am uncomfortable."[148] Executive Mr. Puffer responded a few days later, stating,

> The Office Manager has endeavored to hold this building and its equipment intact. If we didn't, nothing would stand still very long. Desks would be moved, desks would be exchanged, ventilation would be changed, air would be changed, and I am not quite sure that we would not build the building over again. With all the criticisms of discomfort that we listen to so patiently, still we have the best provision for employees that I know of in any large office in this country.[149]

Puffer's response reveals not only the executive's unwavering stance on the issue, but also indicates that Whitney was not alone in his distaste for the swivel chairs. Responding to "all the criticisms of discomfort that we listen to so patiently," Puffer acknowledged that many have complained of the chairs by this time. Two months letter, executive William Heath reiterated Puffer's stubborn sentiment, although he also simultaneously acknowledged the widespread complaints caused by the swivel chair. Heath wrote, "If the swinging chair is uncomfortable for Mr. Whitney, it is uncomfortable for at least a hundred other people in the Office, and if uncomfortable for them, I see no way of defending ourselves against the proposal that it is uncomfortable for fourteen hundred. If this Office knew definitely that the equipment which the Company has furnished at very large expense, was going to remain, I am sure they would all be comfortable."[150] Suggesting that employees only complained when they were given a reason to believe it may change things, Heath supported Puffer's unwavering response and indicated, "they would all be comfortable" once they got used to the chairs. Rather than replace the chairs, both Heath and Puffer remained committed to Wright's vision, perhaps at least in part because of their intimate understanding with the high cost of the design.

Despite the executives' firm denial of any chair replacements, clerks seemed to have taken the matter into their own hands. As Heath described, "Some, however, have taken the initiative in ordering chairs and I have no power to prevent it, and if it is not prevented in some Departments I hardly see how it can be prevented in others, and I would not feel as though I could defend against the Office requiring reseating if all the other Departments secure it."[151] While no firm announcement regarding the chair policy seems to have been made, correspondence regarding this issue virtually disappeared after 1915. Many images after this time depict the original swivel chairs and desks still in place, but there is at least one that indicates a more subversive approach to employee comfort. Figure 15 depicts a worker's solution to this issue, which was perhaps even unsanctioned by executives like Heath and Puffer. Depicting the main floor of the light court around 1920, the image reveals two employees, a male and a female, who have moved one of the wooden chairs from the fifth floor restaurant to the edge of the metal desks. The metal chairs and desks remain in place, but the relocation of these two wooden chairs indicates that the furniture may have become more mobile throughout the building than Wright originally intended. Despite Wright's attempts to fix the furniture, and even employees, in place, this image confirms that he could never quite overcome the architectural adaptations that come with human use over time.

On the fifth floor, Wright created wooden chairs for the restaurant, which were substantially different from the metal chairs and desks provided in the office spaces. While both were open to public view on the Larkin tours, visitors typically sat in the chairs at the restaurant for significant periods of time while they ate. This may have led Wright to consider the ergonomic conditions of the restaurant chairs more carefully than in the office swivel chairs, as office workers admitted they were more comfortable. The straight-backed, arms-free chairs encouraged proper posture, were constructed of wood rather than metal, and were outfitted with leather upholstery for comfort and elegance. The chairs were arranged around wooden mission-style tables that featured swivel tops, which could be tilted to transform into seat backs, serving as benches to accommodate more diners or a larger crowd for a meeting. Wright therefore designed convertible furniture for both the restaurant and the office spaces, but his use of different materials conveyed different aims for their use by visitors or workers.

While Wright designed most of the furniture at the Larkin Administration Building, Perky acquired furniture from the Roycroft workshop for many of the public spaces at the Palace of Light. Perky populated the factory's lobby and reading rooms with Roycroft furniture that he purchased from the East Aurora campus for $5000.[152] Some sources suggest that Perky not only chose the Roycroft furniture himself, but also directed their placement in those rooms to ensure a substantial degree of control over his vision of the spaces.[153] Despite the tension that arose between Perky and Hubbard regarding their shared logo, the inclusion of Roycroft furniture throughout the factory's public spaces was viewed as a mutually beneficial arrangement for both businesses.[154] Not only was the furniture deal endorsed by Hubbard himself, but Perky also placed an advertisement for the Palace of Light in Hubbard's *Philistine* magazine.[155] Perky's selection of Roycroft furniture for his factory reveals his attempts to soften the industrial image at the Palace of Light through interior design, aligning the public spaces with a sense of artistic craftsmanship that is seemingly at odds with a modern conception of industry.

Designed and built at the Roycroft campus rather than by the building's architects, the furniture at the Palace of Light was imbued with different cultural associations than the metal chairs at the Larkin building (Figure 16). Located about forty miles south of Buffalo in East Aurora, the campus provided an alternative to an already heavily industrialized urban life. There, Elbert Hubbard established a lasting legacy of the Arts and Crafts Movement, where artisans could go to practice and enhance their crafts, including book-binding, copper hammering, furniture design, jewelry design and ceramics. Influenced by the writings of William Morris and John Ruskin, the Roycroft's architecture, furniture and philosophy celebrated the values of dignified work, devotion to the mastery of a craft, and embracing the imperfections of the handmade. The Roycroft extolled the virtues of working without machines, in a somewhat imagined pre-industrial utopia. Founded at the turn of the century, the institution was in part a reaction to the sudden predominance of mass-produced goods, mechanical uniformity and factory labor that had suddenly become prevalent in industrial America. Perky's factory, which mass-produced cereal products, was inevitably aligned with this vision of industrial America, and he took great pains to counteract that public image. Obtaining Roycroft furniture for the factory's public spaces therefore provides just one example of the ways in which Perky used design to communicate the values he wished the public to perceive at the Palace of Light.

The Roycroft campus served as a counter-movement to industrial dominance, but it inadvertently spoke of the Industrial Revolution as much as a new factory did, just in different ways. Although it shunned industrial production methods, industry was inevitably intertwined with the Roycroft. The Roycroft serves as an excellent historical example of the broader cultural context of modern industrial manufacturing. Reacting to industry rather than embracing it, the Roycroft did not deny the existence of industry but instead sought alternatives to its growing presence. By demonstrating the values of non-industrial methods, the Roycroft also acknowledged the pervasive influence of industry itself. By placing Roycroft furniture throughout the lobby and reading rooms of his factory, Perky illuminated the interdependence of handcrafted goods and industrial production methods.

Perky capitalized on the Roycroft's associations with craftsmanship to soften the industrial image of his factory, counteracting the mechanical notions of industry with the furniture's natural wooden material and organic design. At the Larkin, however, Wright designed office furniture that would convey his own aesthetic through industrially produced materials. Using largely metal rather than wood, Wright's furniture conveyed the nearly opposite impression of the Roycroft. Embracing industry rather than softening its image, Wright designed furniture to convey a modern aesthetic that suggested the Larkin's industrial factories just outside the Administration Building. While Wright created artistic designs for metal office furniture that could be assembled in a factory, Perky acquired wooden furniture for his factory that was handcrafted by artisans at the rural Roycroft campus. These varied approaches to interior design indicate the important role that furniture played in balancing the architectural image of these two industrial corporations.

Reading Spaces

Industrial corporations were advised to incorporate a space for reading into their architectural plans, and trade journals and employer associations encouraged this trend, stating "To assist in thus cultivating thoughtfulness, a factory library and reading room are valuable."[156] While other spaces aimed to improve the physical and social health of workers, the factory reading room attempted to influence their mental health. Along with many companies across the country, both the Larkin Company and the Shredded Wheat Company incorporated a library-style space into their building designs.

The Larkin Company boasted a library on the third floor of the Administration Building, made available to all employees during their leisure time. Emphasizing that the room was "attractively furnished and well lighted," advertisements provided detailed descriptions of the spatial amenities and book-lending initiatives undertaken by the Company. Popular homemaking figure Marion Harland devoted considerable attention to the library during her company-sponsored trip through the factory. She wrote of the reading room, "its shelves contain several hundred volumes furnished by the Company...The Buffalo Public Library maintains a branch here, with about 400 volumes, which are frequently exchanged. Any employee has access to the latest magazines, and may take current issues home."[157] The sheer number of volumes, as well as the plush furnishings, were central to the library's ability to impress both outsider visitors and factory employees.

Decorative touches were prominently featured in the Shredded Wheat Company's reading rooms as well, demonstrating the importance of furniture in cultivating the impression of an intellectual environment. Corporate advertisements in national publications like *Harper's Weekly Advertiser* testified to the prominence and luxury of these rooms at the Palace of Light. They wrote, "The building is entered through a reception-room, on either side of which are writing and reading rooms for guests, furnished with beautiful rugs and sumptuous weathered-oak, leather-upholstered furniture."[158] Pamphlets celebrated the "hundreds of periodicals" available in the employee resting room, but made no mention of whether more substantial volumes were available for employee use. Although no description of the book collection follows, the emphasis on furniture suggests the space may be one more geared toward the display of intellect rather than its actual pursuits.

By placing the reading rooms adjacent to the reception lobby, the Shredded Wheat Company invited a more sophisticated audience into these spaces. While the Larkin Company advertisements emphasized the universal employee access to the library, the Shredded Wheat Company instead promoted its attempts to cater to the upper echelons of its outside visitors. Little evidence exists of much employee interaction with this library, although it is likely that office executives located in this building may have wandered in from time to time. Figure 18 depicts female employees using the library in a seemingly posed arrangement. Overall, however, even the company's own advertisements distinguish these rooms as "for guests," attempting to attract a visitor clientele rather than demonstrate their charitable use of this space for employees. Elsewhere, the company made substantial attempts to promote their welfare programs for factory employees, ranging from lunches to activities to resting areas. In this context, therefore, these reading rooms were placed in a different category than they were at the

Larkin Company, aimed towards recruiting guests rather than impressing customers interested in employee benevolence.

Despite this curious segregation of workers from visitor reading rooms, the Shredded Wheat Company made thorough attempts to provide educational opportunities for employees in other ways. As the same *Harper's* advertisement insisted, "There are numerous other features for the mental betterment of the Shredded Wheat family which might truly be called educational."[159] The list of these programs includes a choral society, dancing class, band and orchestra, demonstrating a blend of recreational and group activities that capitalized on employee leisure time in order to strengthen their bond with the corporation. While some of these activities are only loosely 'educational,' others more represented a more direct attempt to influence the mental betterment of employees.

Architectural plans and historic images reveal the presence of classrooms in both the Palace of Light and the Larkin Company, setting aside designated space for employee education in a variety of realms ranging from vocational to domestic. Educational offerings were a long established tradition for Perky, and he founded several cooking schools during his career, all intimately intertwined with the consumption of his own products. Students at these schools learned not only the values of whole wheat, but also useful skills that extended beyond merely advertisement. The result was a curious mixture of early twentieth-century education that blended scientific knowledge with his personal beliefs, and practical applications with promotional considerations. His educational efforts coincided with the establishment of the domestic science movement, which had recently garnered increasing speed and traction in the public eye. Pioneers in the movement such as Catherine Beecher and Ellen Richards made great strides in establishing schools for women to learn proper housekeeping methods that ran from cooking and baking to sanitation and minor kitchen repairs. The history of this early domestic science is twofold, and many scholars have addressed its fascinating, complex contradictions.[160] On the one hand, it witnessed the emergence of several women to prominent careers outside of the home, and on the other, it still told women that their primary contributing role was inside the home.

The establishment of Perky's first school evolved, perhaps unsurprisingly, out of a combination of advertising motives and educational concerns. After hiring Harriet Higbee as superintendent, together they founded The New Era Cooking School inside the Worcester factory in 1897. The aim was to train young women in some of the benefits and preparation methods of Shredded Wheat, alongside some basic cooking and homemaker skills to round out their education. Perky's company would then hire the most successful students as traveling promoters of the product, conducting field demonstrations.

Since they would essentially be physical advertisements promoting the healthy qualities of his product, Perky specified in his search for students that they be young, attractive women with good communication skills.[161] Today, this would raise eyebrows regarding the objectification of women in the service of personal profit, although it perhaps still continues in some contemporary advertising methods. Yet, Perky's odd combination of an educational school and advertising strategy created an additional pull. Even though students would become walking promotions for Shredded Wheat, they were also given the additional opportunities to learn basic homemaking skills, sophisticated communication strategies, and to travel while conducting demonstrations. Like the field of Home Economics emerging at the time, Perky's cooking school provided a complicated blend of gendered opportunities and inequalities.

Nonetheless, within just two years Perky's school was a success for both his company and his students, and he was looking to expand into a bigger space. In 1898, Perky paid $70,000 for a large property on the edge of Worcester, the site of what was once the Oread Collegiate Institute. The college, the second of its kind in the country for women, had been founded by the notable abolitionist Eli Thayer in 1845. Thayer had modeled the school after his alma mater, Brown University, providing an impressive classical curriculum at a time when there were few opportunities for women to study these subjects in a formal setting. The grandeur of the institution was reflected in its architecture, which was designed as a replica of a Scottish castle (Figure 19). Built out of local granite, the structure boasted two round corner towers connected by a three-story parapet, with the original intention of having four towers enclosing a quadrangle. After several decades in operation, the school was closed and had fallen into some disarray by the time Perky purchased it for his school.

Although the previous classroom layout was well suited to his needs, Perky quickly updated the structure by adding modern amenities and appliances that befitted a school of domestic science. Telephones, coal ranges, refrigerators, soapstone sinks and gas stoves were added, as well as a new indoor plumbing system, steam heating, and electric and gas lights. Perky made aesthetic changes to the building as well, including new hardwood flooring with oriental rugs, a rooftop garden, and a full cleaning of the exterior granite. After just forty-five days of repairs, Perky had spent an additional $55,000 to adjust the property to the specific needs of an educational institution.

In 1899, the School of Domestic Science at the Oread Institute became Perky's second venture into the field of health education. With these amenities in place, Perky attracted a number of women to study at the institute. Most of them attended Oread under scholarships paid by Perky himself, although later he found ways to convince local women's clubs to contribute to the $200 tuition fee. During their one-year of attendance, students were instructed in a combination of practical domestic skills and communication tactics, ranging from cooking, sewing, sanitation and food chemistry to psychology and pedagogy. On Tuesdays and Fridays, the Oread Institute was open to visitors, with some classes open to public observation.

The primary method of instruction was a direct engagement with these tasks, reflecting the school motto of "learn to do by doing." Split into two groups, half the students would begin their day in the laboratory while the other half would perform basic housework tasks such as sweeping and scrubbing. Students would take inventory of the pantry, learning to grocery shop at the market everyday. In the warmer months, they grew fruits and vegetables in the garden. During communal dinners, students would rotate at the head of the table in order to practice their hostess skills. Although the Oread Institute was staffed by a few housekeepers, a chef and a butler, the students were largely given the tasks of running the Institute under their supervision.[162]

The Oread Institute provided a valuable, practical education for its students, but it unmistakably benefitted Perky as well. By molding these women into human endorsements of his products, Perky went to great lengths to communicate the nutritional benefits of whole wheat. His efforts were met with increased corporate presence and profits, and within just a few years he was looking to expand both his factory and the school. Although the Oread continued to operate in Worcester after his move to Niagara Falls, Perky planned to establish another school at the new location. Due to resistance from the board and lack of funds, this project never came to fruition in quite the way he had hoped. He did, however, manage to make an educational impact in Niagara Falls through a series of cooking classes, lectures and clubs that echoed Perky's personal brand of advertisement and nutritional instruction.

Although it was never built, the architectural plans for Perky's Niagara Falls school speak volumes about both his sense of style and his mixed motivations. After receiving designs from a number of firms, Perky selected a plan for his school by August Esenwein. As partner in the prominent local firm of Esenwein and Johnson, Esenwein would go on to design a number of important buildings, including several cultural institutions, schools and the Temple of Music at the Pan-American Exposition where President McKinley was shot. Often building in the Beaux-Arts style, as well as some excellent examples of Art Deco and Art Nouveau details, Esenwein and Johnson was a reputable, recognizable firm in the area. Perky took a liking to Esenwein in particular, an immigrant from Germany with whom Perky shared a love of the culture.

While no illustrations of the design seem to have survived, Esenwein worked with Perky to design a large school and dormitory that evoked the Worcester Oread Institute. Capitalizing on Perky's interest in castle architecture, Esenwein envisioned a structure of red stone overlooking the Niagara River. An American fascination for European castle revival styles was common in the late nineteenth century, and Perky was no exception to this trend. Medieval ornamentation from the Romanesque period adorned several residential and civic buildings in America, inspiring newer adaptations of these influences into more original high-style works, such as those by H.H. Richardson. Esenwein's design operated within this attraction to European traditions, and the structure was replete with castellated towers, long narrow windows and hefty stone. With dormitories for 250 women, the Niagara Falls Oread School design lent a sense of tradition and gravity befitting an institution of instruction. At a time when Perky's wallet was particularly strapped for cash, construction costs were estimated at $324,000. Although he attempted to convince the newly established board of the Shredded Wheat Company that it was necessary, the plans were eventually abandoned in search of more cost-effective methods.

Unable to build any new structures for the school, Perky decided to open the new Oread Institute inside the Palace of Light instead. Reassigning spaces in the already existing floor plan, he used the massive structure to accommodate his needs. The large auditorium served as an excellent lecture hall, two rooms on the wings provided well-lit classrooms for cooking seminars, and a large room on the top floor became a gymnasium for exercise. Additionally, several of the residential buildings that Perky had purchased adjacent to the grounds could be used as housing and offices for faculty. In order to accommodate 100 students a year, Perky offered students the opportunity to earn tuition through factory work. By spending half their time wrapping biscuits or packing cartons in the factory, and half in the classrooms for training, Perky envisioned clever ways in which he could finance a school, hire inexpensive labor and also promote his product in one fell swoop.[163] Although he could not afford to express the grandeur of his institution with new building construction, he used other methods to enforce the educational aspects of his endeavor.

At the Palace of Light, the Shredded Wheat Company offered a variety of classes that aimed to improve communication skills, thus shaping employees into better public representations of the company and product. Much like Perky's earlier efforts at the Oread Institute, the Shredded Wheat Company provided employee instruction in rhetoric, elocution and typewriting, aimed towards improving skills for the workplace and beyond. Available to both women and men, the Company provided shorthand and typewriting classes, "the only requirement being that they possess a fair knowledge of the common English branches. The Pitman system of shorthand, touch operating of the typewriter, business correspondence and legal forms are among the subjects taught."[164] Rather than train employees for significant advancement beyond the factory, however, these classes provided just enough instruction to improve their efficiency and earnings at the Company, rather than encourage them to move elsewhere.

The Shredded Wheat Company participated in this national corporate trend by offering classes in cooking, deportment and elocution for its female employees. As a food factory, the company's cooking classes were some of the most popular manifestations of this kind of welfare work program, and enrollment was later extended to nearby resident homemakers as well. Cooking classes taught a variety of topics, ranging from how to properly cut a carcass of beef to how to create simple meals for the whole family. Shredded Wheat products were featured of course, but classes addressed a broad variety of skills and applications. By conflating the spatial functions of the factory and the home, female welfare programs simultaneously domesticated the factory and women employees. Homemaking classes communicated the benevolence of factory life to the public while also ensuring that women workers ultimately identified their social role as what Tone has described as, "the mothers and wives of tomorrow."[165] For employers, the benefits of providing these programs were manifold, undoubtedly improving their public image on several levels.

Persistent in his quest, Perky envisioned a new form of school on the grounds. Although it never came to fruition due to his early death in 1906, his intention to form the "Million Dollar Club" reflects his innovative approach to domestic science education. The plan was designed to educate young men, rather than women, which somewhat complicated, or perhaps reinforced, the typical gendered perception of domestic science as a female realm. Using the historic Porter residence as its headquarters on the factory grounds, Perky aimed to create an educational environment that would train men in both business education and natural sciences. Aiming to teach men how to set up their own food clubs and communicate healthy nutritional advice, Perky set aside one million dollars of his own funds in order to establish the Club. The money was to support fifty students, one from every state in the country, who would then return home to spread the word of Perky's instruction. The business model for the Million Dollar Club was remarkably similar to the Oread Institute in Worcester, serving to mould young students into a curious blend of educators and advertisers.

The differences between these two programs, however, indicate some prevalent attitudes regarding the appropriate division of work between men and women at the turn of the century. Although they would be taught similar subject matter as women at the Oread Institute, the pedagogical emphasis at the Million Dollar Club would focus less on practical skills like cooking and housekeeping, and more on elocution, organizational skills and business methods. Perky envisioned the club as "the Natural Science Department" of the Shredded Wheat Company, whereas the Oread Institute was likely considered as more of an extension of advertising, or even housekeeping. A woman's duty was to improve herself through an education in practical matters such as cooking and cleaning, so that she could provide for her family's health from home. A man's duty, however, was to learn organizational skills so as to effectively run a business, to engage in higher forms of scientific enquiry, and to maintain a sense of order and discipline amongst his peers. Students at the Million Dollar Club were to be trained in military drills in uniform; Oread students were experimenting with new recipes for Shredded Wheat. Although the upper echelons of the new domestic science field were providing groundbreaking opportunities for women such as Ellen Richards, there was still much work to be done before the field would be liberating for women from a contemporary perspective.

The Larkin Company also offered vocational classes, although it did so with different aims. Established partly in response to the problem of frequent employee turnover, the company offered instruction in accounting and clerical work in order to encourage workers to advance within corporate ranks rather than seeking employment elsewhere. The fourth floor of the Administration Building annex housed a classroom, equipped with all the basic amenities for traditional instruction (Figure 20). As one corporate pamphlet described, "a School of Instruction is maintained, which qualifies clerks for more effective work. Students receive pay while being taught...When possible, high school graduates are engaged for clerical work."[166] This educational investment in workers was not without restraints, and Tone acknowledged that these welfare programs had a limit to their generosity. She wrote, “employers expected welfare work to make employees better workers, not employers in their own right."[167] Conducting these vocational improvements within company walls gave a sense of control over the appropriate use of these new skills. Education was meant to be a reciprocal gift, given to the employee with the expectation that it would improve their efficiency during company time.

For female employees, corporations generally provided domestic education programs rather than providing technical skills. Countering public concern over the influence of factory life on women, large corporations such as NCR, Heinz and the Shredded Wheat Company provided classes designed to emphasize the eventual role of women as homemakers. While men were trained in skills aimed to improve their lifelong work in industry, women were encouraged to view the factory as a finishing school. Seen mostly as an interim moment between adolescence and marriage, factory work was considered to be temporary position for women rather than a career. By providing classes in domestic skills, factory employers reinforced this opinion through a variety of cooking, sewing and cleaning classes masquerading as welfare work. The merging of two seemingly opposite environments -the factory and the home- improved corporate image while also confirming culturally constructed gender norms.

Dining Spaces

The factory lunchroom became an important architectural element during this time, and the evolution of its design reveals some employer attempts to negotiate the introduction of these domestically oriented welfare programs into an industrial setting. Like NCR, International Harvester and Westinghouse Electric, the Larkin Company and the Shredded Wheat Company incorporated employee dining space into the architectural plans of their new industrial headquarters. Trade journals provided guidance in developing and managing these spaces, often reproducing other examples of preferable accommodations for industrialists to use in their own structures. Illustrations of exemplary dining rooms appeared in *Engineering Magazine* and *Factory*, often emphasizing the proper furniture and cooking facilities at factories such as NCR and Sherwin Williams, and UK facilities such as Port Sunlight and Cadbury's Bourneville. Following these suggestions, the solutions akin to those installed at the Larkin Company and the Shredded Wheat Company were deemed amongst the more favorable examples.

At the Larkin Company, a grand dining room was thoroughly incorporated into Wright's design for the Administration Building (Figure 21). A large portion of the fifth floor was devoted to food service, with seating for diners on the two long sides of the rectangular plan while a bakery and a kitchen occupied the north and south ends. Light from the large skylight over the central court illuminated the space, along with diamond shaped skylights and a few small decorous lamps. Low ceilings provided an expansive horizontal perspective for diners, emphasizing the distance across the building and central court from end to end. The size and arrangement of the restaurant aimed to maximize space, accommodating up to 2000 people in shifts of 600 diners each during lunch.

The restaurant at the Larkin Administration Building suggested a domestic scene, where diners were grouped around tables of eight to ten in order to provide an intimate family-style setting. By placing workers around a smaller table, Wright's dining room design promoted conversation and interaction across hierarchal ranks within the company. The architectural plan, layout, and furniture encouraged what Quinan called, "the spirit of familial unity."[168] Here, welfare work manifested in the form of food consumption, by providing a corporate restaurant that promoted employee interactions amongst different departments. High-ranking corporate executives such as John D. Larkin, Darwin D. Martin and William Heath dined here alongside office staff such as secretaries and mail clerks. Outside visitors were impressed with this message, noting that "the Restaurant is conducted for the Company's clerks, and deserves high praise...To directors and distinguished guests is served the same food as the youngest clerk may order."[169] Easily available to workers within the Administration Building, the restaurant was promoted to employees, customers and tourists as primary evidence of the Larkin Company's efforts to facilitate a sense of unity amongst employees of different ranks.

Like many welfare work programs, it is important to take this one with a grain of salt. The restaurant was designed with more than just this corporate benevolence in mind, and also reflected promotional considerations and hierarchal agendas. The Larkin dining hall was constructed and displayed for not just its own employees, but also for scores of tourists. Deemed a 'restaurant' rather than a lunchroom, the Larkin dining space aimed to impress outsiders who came to visit the factory. Office employees were encouraged to commingle while dining there, and tourists were encouraged to take note of that process. Although tourist considerations will be discussed in the next chapter at greater length, it is essential to recognize the significant impact this concern for the public image had in creating these programs and spaces.

Despite its promotion of worker inclusivity, the Larkin Company Restaurant revealed some jarring inequalities amongst laboring ranks. Office workers and executives were encouraged to enjoy the family style seating arrangements, but factory workers seem to be largely absent from this narrative. It is difficult to know for certain if factory workers from the adjacent buildings were encouraged to dine in this elegant space, although there is some evidence to the contrary. An employee handbook from 1928 stated, "Employees are requested not to use the Restaurant unless all food eaten is bought there."[170] While no company materials specifically discourage factory workers from using the space, the costs of a meal there may have been prohibitive on a regular basis, and worker uniforms are absent from any photographs or narratives of the space. Placed in the Administration Building, the restaurant seems primarily aimed at serving tourists and office workers, rather than those engaged in more physical tasks in the adjacent buildings. Although the dining arrangements amicably invite cross-hierarchal conversation amongst clerks and higher executives, there still seems to be a notable segregation between the white-collar office workers and the blue-collar factory workers.

The Larkin Company opened an alternative worker dining space a few decades later, perhaps to accommodate their growing employee base. Figure 22 illustrates the new cafeteria space in July 1920, located in the basement of Building E, across from the Administration Building, on Seneca Street. This image suggests a drastic change in service style and employee demographics from the fifth floor restaurant. Mixing genders and uniforms, the diversity of employee clientele indicates that this cafeteria served both office workers and factory workers, although of course the most soiled laborers and mechanics are not pictured here. Women who likely worked in the factory portions of the Larkin Company, perhaps packaging soaps or bottling perfumes, appear here alongside men in sensible suits. Although we see no easily recognizable high executives here, the food service system seems to provide an equalizing force amongst the ranks of employees. All are lined up in an efficient assembly line in order to obtain the same pre-made stacks of quick sandwiches.

The architectural qualities of this cafeteria provide a significantly different setting from the Administration Building restaurant. While the fifth-floor restaurant was flooded with natural light, custom-designed furniture and sweeping views, moving the cafeteria into the basement of a factory building across the street eliminated many of these visual benefits for diners there. Concrete floors, metal railings and mass-produced furniture sent the opposite message to employees, valuing high-volume food service rather than an intimate, restorative setting. The difference of the two terms 'cafeteria' and 'restaurant' confirms the disparities between these spaces. Found in corporate archival records rather than a promotional publication, this image illustrates that the cafeteria is aimed less towards public display and more towards everyday efficiency.

Conflicting accounts from former employees indicate a mixed reception of this new food system. Oral histories from two different workers, Jeanette Weide and Daniel Larkin, suggest the diversity of approaches to the Larkin lunch program. Weide, who was an entry-level office worker in the 1930's, remembered going to the cafeteria infrequently because she preferred other options. She described the lunchroom as "part of the factory across the street, across Seneca Street. Most people probably brought their lunch, there wasn't too much of a restaurant. And you went thought the tunnel if it was bad weather, or you probably ate at your desk."[171] Weide's experience suggests that some workers were underwhelmed with the Larkin Company's attempts to provide lunch service for employees. Daniel Larkin's memory, however, depicted the service in a much better light, indicating that there may have been separate dining accommodations for higher-ranking executives. As an accountant for the company and a family member, Larkin was privileged to eat in what seems to be an additional space, open only to directors. He described, "They had a regular cafeteria set up there, and you could go from the office building through the tunnel to get to the restaurant on the second floor by elevator...It got to be quite popular, they built one part of it to look like a Cape Cod cottage- on the inside it was used for the director's dining room. As a director we had our own little cottage to eat in."[172]

Although no images of this space have been found, Daniel Larkin remembered a vastly different dining experience than Jeannette Weide. Larkin described a space on the second floor of Building A, while Weide indicated that she rarely attended the basement cafeteria seen in Figure 22. Both testimonies mentioned the existence of an underground tunnel that connected the Administration Building to the lunchroom building, which the architectural plans confirm. Larkin's 'Cape Cod cottage' director's dining room is a place he remembers fondly, perhaps built in that style to evoke a comfortable sense of wealth and sophistication. Weide, on the other hand, understandably preferred to eat at her well-lit desk in the Administration Building rather than go to the basement cafeteria. These oral histories and images suggest that lunchroom segregation was a pattern that continued outside of Wright's design, as the Larkin Company provided separate dining facilities based on worker status throughout its history.

As a food factory, the Shredded Wheat Company took even greater strides to display its exemplary lunchroom facilities, although it too was not without contradictions. Figure 23 from *The Wonders of Niagara* shows the 'girls' lunchroom' at the Palace of Light, described in the image caption as a "large and cheerful dining room- the employees are served a delicious, wholesome meal as the Company's guests."[173] The company's architecture and policies both emphasized this form of welfare program, featuring food service as a primary venue for employee betterment. The dining room exhibited an expansive space broken only by freestanding Doric columns, enabling intimate, family style seating arrangement similar to that of the Larkin Company. Natural light flooded the space from both ends, assisted by hanging lamps dotted throughout the room. White walls, plentiful light, and an open, airy space connoted not only comfort, but also reinforced the company's commitment to hygiene.

The food service also emphasized the company's dedication to cleanliness and health, essential qualities to convey in all aspects of an industrial food factory. Corporate pamphlets boast that the foods are served a la carte, celebrating the notion of employee choice. The lunchroom proudly provided "a delicious, wholesome meal, embracing a selection of foods prepared with reference to the tastes and physical necessities of the employees."[174] In all likelihood, most of these diverse choices involved Shredded Wheat products in some way. Menus confirm that Shredded Wheat was in almost everything served at the factory, ranging from coffee to dessert.

Coffee in particular was a vehicle for the continual dispensation of Shredded Wheat to employees. In what approached a nearly cult-like fascination for the daily dosage of wheat products, the company enforced a coffee-drinking policy that is somewhat reminiscent of ‘drinking the kool-aid’ today. Some historians even credit Perky with the invention of the “coffee break,” tracing the practice back to the early days of production at the Palace of Light.[175] One newspaper described the introduction of this policy in 1901, allowing workers to break from work in order to consume coffee made from Shredded Wheat. It was described as follows:

> One of the novel arrangements introduced by Mr. Perky is the dispensing of coffee, or, more properly speaking, of Shredded Wheat drink to every workman on the ground twice a day. The stone lodge at the corner of the old Porter property has been converted into a ‘coffee’ house, with all the necessary equipments. About 60 gallons of a beverage brewed from roasted Shredded Wheat are made daily, and taken around in the forenoon and again in the afternoon to the men on the works. It makes a very palatable drink and is greatly relished.[176]

The coffee break was an excellent promotional tactic, simultaneously demonstrating the company’s benevolence towards workers and the restorative values of the product itself. Furthermore, the flexibility of Shredded Wheat was demonstrated in its insertion into coffee. The lunch menus continued to exhibit this quality, transforming Shredded Wheat into a diversity of products from chicken pot pie to dessert pastries.

In advertisements, however, the lunch offerings were depicted as not only bounteous and nutritious, but also were crafted with the utmost care to sterilization, temperature control and cleanliness. *The Wonders of Niagara* assuaged any customer fears of unhygienic prepared foods, stating, “The food that is served to employees in the two dining rooms is carefully examined, the milk is tested daily, the dishes are all sterilized and the use of cold storage food is prohibited.”[177] Lunch service at the Palace of Light presented a two-fold opportunity for promotional advancement. Corporate advertisements reproduced images like Figure 23 along with text that emphasized both the architectural amenities and hygienic qualities of this nutritious service.

Gendering Spaces

While the Larkin Company promoted its efforts to disrupt notions of class at its restaurant, the Shredded Wheat Company paid specific attention to early-twentieth-century conventions of gender in the workplace lunchroom. Like many corporations at the time, the Shredded Wheat Company provided segregated facilities for its male and female workers, including bathrooms, resting rooms, exercise spaces and even separate entrances to the building. Women dined in the main lunchroom on the fifth floor, enjoying “unparalleled views of the upper [Niagara] river.” Men, however, ate “at the eastern end of the third floor, which has been equipped in lunch counter style.”[178] The quality of dining accommodations seem to differ between these two gendered spaces, providing women with a comfortable, luxurious environment and men with a more efficient, casual space.

These spatial considerations were at least in part a reflection of broader cultural concerns, as industrial architecture increasingly became the primary medium for corporations to assuage public fears of moral corruption. It is important to note here that, unlike the grain industry seen in the previous chapter, making breakfast was seen as women’s work, even in a factory. A substantial portion of the workforce at the Palace of Light was female, evident in a range of photographs of women working at both assembly lines and clerical positions. While it seems that the jobs dealing directly with heavy lifting or machinery were reserved for men, female employees at the factory were engaged in a number of tasks, including labeling, shipping, and sorting the cartons of Shredded Wheat. The Larkin Company also hired a significant female workforce, although they were engaged primarily in low-level clerical tasks. At the Administration Building, at least half of the clerical employees were female, engaged in dictation, mailing or typing.[179] Notably, the Larkin Company also hired women to work in the adjacent factories, where by 1913, 500 female employees worked alongside 1100 men.[180] Booklet images reveal that women at the Larkin factories, much like those at the Shredded Wheat factory, were typically assigned lighter industrial tasks than the men, such as labeling, shipping and quality control. Industrial jobs like these provided women with an excellent opportunity to earn independent income outside the home, but their work environment was carefully curated in order to limit female exposure to many social and physical aspects of working in a factory.

Industrial corporations provided an impressive diversity of welfare programs in their attempt to persuade the public that the factory could make a positive impact on working women's lives. Welfare work programs that were aimed towards women were remarkably different than those for men, and this is reflected in the segregation of the lunchrooms at the Shredded Wheat factory. Although women only comprised roughly twenty-five percent of the industrial workforce by 1920, more than half of corporate welfare programs were aimed towards women.[181] Most of these female welfare programs were designed, Tone suggests, "to protect female vulnerability and cultivate domestic proficiency."[182] Female welfare programs were just one manifestation of these broader cultural concerns for maintaining female chastity, innocence and domesticity, even if they were required to work outside the home.

As large numbers of young, unmarried women began to join the industrial labor force at the turn of the twentieth century, public nervousness arose over the unsavory influences these factories might have on them. Both male and female labor activists were concerned that women who worked in factories would be exposed to physical stress, long working hours, and perhaps most threatening, men, and sought ways to 'protect' female dignity from these seemingly harmful elements. Even activist Jane Adams worried that laboring women would be negatively influenced by the newfound freedom of the workplace outside the home, and, if gone unchecked, "would fall into a vicious life from the sheer lack of social restraint."[183] Conversely, many also worried about the impact that the daily presence of women would have on men, rather than solely the male influence over women. As historian Nikil Saval described, "Victorian America's stern observance of the separation of spheres for women and men suddenly no longer held, and it remained an open question what kind of influence women would bring to the male preserves of the workplace."[184] Often viewed as a sexual distraction, many worried that a young, unmarried female workforce would present a hazardous temptation to male workers. This flawed logic contributed to a "generalized fear of what men and women working together might do to both sexes in the office, and to society outside it."[185] In response, these fears led some companies to segregate their work environments by sex.

Multiple architectural solutions were incorporated into the design of the Shredded Wheat factory in order to segregate employee spaces throughout the workday. Separated by gender, employees rarely encountered the opposite sex outside of designated activities supervised by the corporation itself. Separate entrances, time clocks, bathrooms, and recreational spaces ensured, theoretically, that female chastity would not be compromised by the corrupting influences of male coworkers. These architectural reforms thus reinforced a gendering of spaces as well as the activities performed within them, providing clear delineations between male labor and women's work in ways that extended beyond the factory walls.

The Shredded Wheat Company lunchroom illustrates one typical approach to this kind of gendered space. In both programming and architectural design, the lunch service reinforced appropriate social mores for women as distinct from that of men. Employee handbooks and promotional pamphlets both emphasized the charitable nature of the company in providing free lunch to female employees. Lunch was served in a separate dining room solely for women, and at this meal "the girls are guests of The Shredded Wheat Company and every effort is made to make the noonday luncheon one of the delightful relaxations of the day."[186] While many companies, such as NCR or the Larkin Company, charged a small fee for employee lunches, the Shredded Wheat Company took pride in providing it free of charge for its female workers. This free lunch had strings attached, however, and the female employees took turns in serving the lunch, on an alphabetical rotation. By providing experience in food service for women, this lunch program aimed to give them 'practical' domestic skills that would be of use to them later in life, yet it also provided free labor. Due to its specialty as a food factory, the company prioritized employee lunches, while also ensuring that the public was aware of this act of charity.

Motivations for this free lunch likely extended beyond a simple interest in employee welfare and into the realm of social control. By providing a free and nutritious lunch for female workers, the Shredded Wheat Company effectively dissuaded women from venturing outside the factory grounds in search of food elsewhere. Most of the alternative lunch options at the time required visiting urban saloons, and women were greatly discouraged from frequenting them. Corporations echoed public opinion in this realm, and worried that women who spent their hard-earned money at these saloons would tarnish their reputations under the influence of some of these seedier patrons, or worse. With money in their pockets, women became ignorant consumers in the eyes of these corporations. Attempting to avoid the degradation of women workers, and thus the corporation that employed them, the Shredded Wheat Company thus made a gallant, highly publicized attempt to reinforce proper female behavior by providing them with a free lunch in a more benevolent environment.

This sense of control was not limited solely to women, however, and was partly inspired by what corporations believed to be typical male behavior. The general corporate distrust of how male workers would use their leisure time led to the implementation of several welfare programs designed to reconfigure their activities, including the factory lunchroom. Tone noted that these policies "responded to both the virtual absence of public eating facilities for wage earning women in the early 1900s and the prominence of the working class saloon as an eating site for men. By controlling their food source, employers hoped to provide healthy meals and keep workers out of socially undesirable settings."[187] Although employees were not firmly required to eat lunch at the Palace of Light, corporate policies and architectural design strongly encouraged this practice as part of the path to personal betterment.

The Shredded Wheat Company provided lunch for its male laborers in a separate dining room, where a "nominal charge" of about ten cents a meal was applied. The decision to charge men and not women addresses several aspects of corporate welfare aims. In addition to providing financial compensation for the corporate cost of lunch service, this policy also put male laborers into the role of breadwinners. By treating male employees as paying guests rather than charity cases, this lunch policy reinforced their traditional masculinity by giving them the power of consumer choice and fiscal responsibility. The cost of lunch was so low that it thoroughly discouraged workers from dining elsewhere, but still provided some semblance of choice for men deciding where to eat during their lunch break. In contrast to the female dining room, no images of the male dining room appear in company advertisements. This may indicate that it was more sparsely furnished and decorated, or that it simply would have been redundant to show two images of similar dining rooms. Whether the male lunchroom was simpler or similar to the female dining room, these two spaces nonetheless reinforced twentieth-century gender norms within the context of an industrial factory.

Countering public concern about its negative influences, industrial corporations initiated architectural adjustments that reworked the image of the factory as a place of social reform, rather than corruption. While factory beautification provided the most visible evidence of their efforts, corporations also provided opportunities for moral betterment through a variety of educational programs for employees. These, too, provide historical evidence of the gender inequalities, class injustices, and early twentieth-century social norms that were thoroughly woven into corporate actions and even the factory walls themselves.

Despite the strict moral codes, gender roles and behavioral patterns that were enforced by these architecturally segregated spaces, employees nonetheless found ways to engage in unregulated social interactions. As much as companies tried, they could not altogether prevent the sexes from mixing. Both the Shredded Wheat Company and the Larkin Company organized dances, where male and female employees could interact in a supervised social setting. Certain rooms, such as the auditorium, were used specifically for this purpose, where sanctioned social interaction between sexes occurred in the form of dances or lectures. In this way, "corporate architecture was not a mere symbol of corporate culture but rather a part of a larger process of social construction."[188] Segregated from one another in multiple ways, including separate entrances, resting rooms, and lunchrooms, the factory architecture itself played a role in conveying and reinforcing appropriate employee behavior. Nonetheless, employees found ways to mingle away from the cautious gaze of employers. The rooftop, as a relatively unprogrammed space, provided the architectural counterpoint for this kind of unsanctioned interaction, which functioned as a crucial place for social experimentation.

Historian Olivier Zunz provided evidence of this occurring at the Metropolitan Life Building in New York, where "small groups of male and female clerks could and did meet each other on the building roof, where they occasionally danced."[189] Even though the company organized dance lessons and social dances, employees found ways to practice dancing with one another in an unregulated environment. The roof became an excellent social space during these minor transgressions, away from the gaze of employers yet within close proximity to the building's offices. Still within the building yet simultaneously outside of it, the rooftop "became a safe environment in which young men and women could practice the social skills valued in the outside world."[190] Both the Palace of Light and the Larkin Administration Company had landscaped rooftops that likely functioned in this informal way upon occasion. Decorated with multiple plants and stunning views, these rooftops provided space for informal gatherings that extended to the outside world, yet were still rooted in the context of the workplace. As an unregulated place, rooftops performed a vital function in counteracting the highly organized and supervised office spaces below.

Family Spaces

Although women received the most attention from employers in terms of welfare work offerings, corporate narratives insisted upon viewing the laboring employees as a single unified body. Depictions of company workers as "one big family" were increasingly common in the first decades of the twentieth century, and both the Larkin Company and the Shredded Wheat Company participated in this trend. The latter described itself as a "happy family" in several advertisements (see Figure 24), stating, "With most cordial democratic relations existing between management and employees...with everything done for their moral and mental advancement and their physical betterment, it is no wonder the 'Shredded Wheat Family' is the happiest industrial organization to be found in all the land."[191] This trend continued for decades, as *Nabisco* magazine wrote in 1981, "working for Nabisco is like working for a family- so many people have relatives and friends within the plants. This family feeling extends into the community with everyone willing and eager to be involved."[192] The Larkin Company similarly promoted its familial qualities, predominantly through its frequently published employee magazine, *Ourselves*, and a variety of team-oriented events.[193] Although it is difficult to know if employees were actually persuaded by these family narratives, one former employee has described working at the Larkin Company as being "part of one big family."[194]

Family metaphors provided a convenient framework for industrial corporations to address a diversity of public concerns over the size and impact of their operations. Portraying the company as a family simultaneously reinforced the paternalistic, hierarchal relationship between employer and employees while also assuaging consumer fears over the dehumanizing, colossal scale of mass production. In tracing the emergence of this popular promotional tactic, Marchand suggests, "the metaphor of corporation as family...only became more popular as the reality of family-like scale vanished."[195] Increasingly large factories raised eyebrows over the sheer scale of these structures, their products, and especially their employees. A single business owner or a small oligarchic group of men would be in charge of corporations that employed thousands, or tens of thousands, of workers. Positioning this huge employee base as a family provided a friendly, familiar analogy that could assure consumers and workers alike. In this vision, each played a role in the family, no matter how invisible it may seem. In this sense, the family metaphor provided a benevolent framework for comprehending the new, colossal scale of industrial corporations on friendly terms.

While the family image attempted to unify a large, diverse body of employees, it also simultaneously reinforced the patriarchal authority of the employer as a father figure. With an increasing number of young women joining the industrial workforce, positioning the employer as a father to the employee family both solidified his authority and viewed these workers as children, siblings to one another. The family, with its connotations of warmth and softness, "offered a feminine counterpart to the stern, masculine image of the corporate army."[196] Not only did this complicate the gendered image of the factory, but also placed the employer as the paternalistic, ruling figure over this large family. By incorporating women into the family analogy, this image also confirmed the hierarchal structure of men as the generous benefactor of employee health.

Corporations took great strides to soften the edges of their otherwise mechanical, massive operations in the public eye, but it is difficult to ascertain the degree to which employees were actually convinced by these promotional tactics. Although some personal testimonies, photographs and newsletters attest to the satisfaction of workers with these welfare programs, a history of labor strikes, unions, and alternative publications suggest otherwise. While this dissertation has thus far focused primarily on the architectural tactics used to craft a promotional image of industrial corporations, it is essential to even briefly address the perspective of the workers as a counter balance to these elements.

Local newspapers reveal a different reception of the new Shredded Wheat factory, presenting a more cautious reaction to the presence of this industry. The Palace of Light was promoted in advertisements nationwide, but the *Niagara Falls Gazette* offers an alternative perspective on the impact of this structure on workers. Particularly during its construction, headlines about laborer injuries and strikes appeared alongside more positive articles welcoming the new factory into town. During one of many strikes, workers from Local Union 7554 halted construction by ceasing operations and demanding a five-cent pay raise. The Norcross Brothers Construction company was notoriously anti-union, and this resulted in a few particularly public hiccups during the period of construction. While strikes were generally not uncommon, this one unfolded quite publicly in the newspapers, as each side used the press to manipulate public opinion over the impact of the new factory.

Rather than meet these strike demands, the Natural Food Company released a statement threatening to replace the workers with outside help. They published the following on the front page of the Niagara Falls *Daily Cataract*: "If the trouble continues, we can and will send to Boston for men...Our intentions are to hire local help whenever possible, but the fact is some of our force has been made up of inferior help. Some men of this city are green men in this business."[197] Countering these accusations using the same newspaper to its advantage, the union released an insert titled "Plain Statement of Facts" in an attempt to explain their position to the general public.

> Anyone with a grain of common sense knows when workers strike who depend upon their day's work for their daily bread that something must be wrong...The company's claim that conditions and surroundings are for the 'welfare' of the workers seems ridiculous when 225 men and women instinctively rebel against the conditions under which they work....We take this way [newspaper] to make our position clear because we know that a firm like the Natural Food Co., which does world-wide advertising, will naturally have the support of the press in which their advertising appears, or in the press which hopes to profit by their patronage.[198]

The bias of advertising media is not a subtle topic in this response, as this discussion explicitly attempts to counter these promotional effects on the same turf. These debates between laborers and employers not only demonstrate a more complex story than those presented in corporate advertisements, but also does so quite publicly.

The local newspaper here becomes a medium for expression on both sides of this fundamental issue, acting as a public sphere used to challenge and negotiate these agreements. In doing so, local citizens and readers become an important, triangulating element between employers and laborers. Corporations were instigated to respond to every accusation with a positive counter-argument. As Tone reflected, "For every photograph critical of the treatment of industrial wage earners, companies such as NCR and Heinz submitted portraits of a strikingly different scene: nurtured factory laborers happily at play on company grounds."[199] Rather than alienate their customer base, employers bent to the concerns of the public in order to promote a positive image of employee welfare at their factories. Consumer opinion thus becomes an increasingly influential factor in the establishment of fair labor practices. In this instance, the consumers are not at the receiving end of a promotional advertisement, but a controlling factor in the corporate drive to craft a positive image of the Palace of Light.

Whether or not welfare programs actually appeased workers and consumers, corporate efforts to do so resulted in a wide array of visual evidence of these aims. Photographs, advertisements, company newsletters, and cafeteria menus together provide an excellent body of archival ephemera that gestures to this historical moment. Labor historians have attempted to read between the lines of these universally positive promotional materials, pointing instead to evidence of high worker turnover, strikes and injuries. Experts in this field have provided a much richer discussion of these worker discontents than this dissertation attempts to accomplish, largely due to disciplinary differences. What is missing from these exposés, however, is a sufficient analysis of the impact of these welfare programs not just on workers, but also on the factory architecture itself. This dissertation only begins to address this gap while acknowledging the shortcomings of architectural research in this same area. Laborer perspectives must be incorporated into this analysis of welfare work, and the best way to do this from an architectural discipline may be to examine the impact that its corresponding spaces had on its laboring inhabitants, as many of the rooms at the Palace of Light exemplify.

Welfare work transformed the factory into something far more complex than a purely industrial space. Corporate attempts to appease both workers and the consuming public resulted in architectural plans that incorporated a variety of non-industrial rooms to accommodate these social arrangements. The increasing presence of resting rooms, dining rooms, lush bathrooms and classrooms effectively domesticated industrial architecture. Although primarily a place of industrial production, the inclusion of these spaces added elements of consumption to American factory designs. Familiar spaces for leisure and learning offered spatial respite from the somewhat dehumanizing repetition and mechanization of the factory floor. Rather than presenting these structures as a place of mechanical assembly lines, corporate promotions and architectural reforms instead emphasized the factory's ability to assume a beneficial social role. Using these spaces as visual evidence of these claims, the image of the factory was promoted as a place of social reform, able to improve the lives of workers and consumers alike. These welfare work attempts, both spatial and programmatic, aimed to transform the factory in the public eye. By devoting specific spaces to employees' health, corporations and architects together aimed to redefine the cultural presence of the industrial workplace.

More so than any other aspect of the factory's design, glass served as a crucial material that linked architectural design with publicity aims. The physical transparency of glass provided a ready-made metaphor for corporate honesty, suggesting to factory workers, visitors, and distant customer that the company quite literally had nothing to hide. For consumers who were unconvinced of these grandiose corporate claims, some factories opened their doors for tourists to see these marvels with their own eyes. The very act of inviting visitors into the factory gave corporations an opportunity to further promote their honesty, once again insinuating they had nothing to hide. Architecture once again played a central role in conveying these aims, as factories like the Palace of Light integrated physical elements specifically designed to accommodate and control the tourist experience in the first decades of the twentieth century.

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[1] Betsy Bradley, *The Works: The Industrial Architecture of the United States* (Oxford, UK: Oxford University Press, 1996), 261.
[2] Reyner Banham, *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture* (Cambridge, MA: MIT Press, 1986), 106.
[3] Lindy Biggs, *The Rational Factory: Architecture, Technology and Work in America's Age of Mass Production* (Baltimore, MD: Johns Hopkins University Press, 1996), 53.
[4] "Industrial Niagara Falls," *Daily Cataract Journal* (Niagara Falls, NY), December 15, 1900.
[5] The decision to capitalize 'Shredded Wheat' is a difficult one, and one that even led to a U.S. Supreme Court case (no. 305 U.S. 111) in 1938. The popularity of Perky's Shredded Wheat was so prevalent that it later led to the eventual production of Shredded Wheat from other companies. As an attempt to secure the sole rights to the product, the National Biscuit Company (who acquired Perky's company in the 1920's) raised a lawsuit against the Kellogg Company in order to prevent the production of Shredded Wheat elsewhere. The case, which later was brought to the Supreme Court with relevance to greater intellectual property laws, was eventually settled in favor of Kellogg, who now produces Shredded Wheat. As a reflection of this tricky history, this dissertation will capitalize Shredded Wheat when referring only to Perky's incarnation of the product, and his subsequent company, the Shredded Wheat Company. When 'Shredded Wheat' appears, it refers to the product more generally, as made from other sources or as a nutritional element rather than a reflection of any particular corporation.
[6] "Prototype of Local Factory Inspected," *Buffalo Courier* (Buffalo, NY) December 22, 1900.
[7] "Lecture on Pure Food" *Niagara Falls Gazette* (Niagara Falls, NY) Jan 22, 1901.
[8] James Holochek, *Henry Perky: The Shredded Wheat King* (Baltimore: IUniverse, 2007), 234.
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[12] Roland Marchand, *Creating the Corporate Soul: The Rise of Public Relations and Corporate Imagery in American Big Business* (Berkeley: University of California Press, 1998), 255.
[13] For more on the Larkin Company business history and sales methods, see multiple works by Howard Stanger, Jack Quinan and Michael Rizzo.
[14] Vincent Scully, "Frank Lloyd Wright," *The Masters of World Architecture Series* (New York: George Braziller Inc. 1960), 74.
[15] Erich Mendelsohn, letter dated October 22, 1924, quoted in Jack Quinan *Frank Lloyd Wright's Larkin Building: Myth and Fact* (Chicago: University of Chicago Press, 1987), 117.
[16] Jack Quinan *Frank Lloyd Wright's Larkin Building: Myth and Fact* (Chicago: University of Chicago Press, 1987), 5.
[17] Ibid, 3.
[18] Ibid, 3-4.
[19] Holochek, 243.

[20] Quinan, 9.
[21] Meryle Seacrest, *Frank Lloyd Wright: A Biography* (Chicago: University of Chicago Press, 1998), 157.
[22] Marchand, 33.
[23] James Patterson, "Altruism and Sympathy as Factors in Works Administration," *The Engineering Magazine 20.4* (January 1901): 580.
[24] Andrea Tone, *The Business of Benevolence: Industrial Paternalism in Progressive America* (Ithaca, NY: Cornell University Press, 1997), 84.
[25] Patterson, 594.
[26] Ibid, 595.
[27] Ibid.
[28] Holochek, 249.
[29] "Olmsted will Lay Out Park" *Niagara Falls Gazette* (Niagara Falls, NY), April 2, 1901.
[30] Holochek, 249.
[31] **"**Announcement of the Shredded Wheat Company Means Much to Niagara Falls" *Niagara Falls Gazette* (Niagara Falls, NY), June 8, 1912.
[32] *Wonders of Niagara: Scenic and Industrial* ((Niagara Falls, NY: The Shredded Wheat Company, 1914), 22.
[33] "Beautify the City," *Niagara Falls Gazette* (Niagara Falls, NY), Apr 14, 1902.
[34] Holochek provided no sources for this comment, which he made on page 249.
[35] Marion Harland, *My Trip thru the Larkin Factories* (Buffalo, NY: Larkin Company, 1913), 19.
[36] George Twitmeyer, "A Model Administration Building," reproduced in full in Quinan, Appendix 1, 149.
[37] Ibid
[38] David V. Mollenhoff and Mary Jane Hamilton, *Frank Lloyd Wright's Monona Terrace: The Enduring Power of a Civic Vision* (Madison: University of Wisconsin Press, 1999), 62.
[39] Ibid, 64
[40] Conservatories, greenhouses, and orangeries are all distinct subtypes of this typology, but for the purposes of this discussion have been grouped together in broader terms.
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[42] Ibid, 14.
[43] Paul Davies, *Architectural History Retold* (New York: Routledge, 2015), 75.
[44] Richards, 15
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[48] Harvey Levenstein, *Revolution at the Table: The Transformation of the American Diet* (New York, NY: Oxford University Press, 1988), 35
[49] Ibid.
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[51] "A Food Factory" *Harper's Weekly Advertiser*, June 1913, 15.
[52] "Announcement of the Shredded Wheat Company Means Much to Niagara Falls" *Niagara Falls Gazette* (Niagara Falls, NY), June 8, 1912.
[53] "How One Great Concern is Advertising the Many Advantages of Niagara Falls," *Niagara Falls Gazette* (Niagara Falls, NY), Feb 22, 1928.
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[59] Ibid
[60] For more on this, see *John Stilgoe, Metropolitan Corridor: Railroads and the American Scene* (New Haven: Yale University Press, 1983).

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[62] Ibid.
[63] Dietrich Neumann, *Architecture of the Night: The Illuminated Building (*New York: Prestel, 2002*),* 4.
[64] Ibid, 7.
[65] Jeffrey L. Meikle, *Postcard America: Curt Teich and the Imaging of a Nation, 1931-1950* (Austin: University of Texas Press, 2016), 103.
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[73] *Wonders of Niagara, 9*
[74] Ibid.
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[76] Ibid, 11.
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[85] Ibid, 40.
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[87] Biggs, 4.
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[92] Ibid.
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[148] "Larkin A Building Correspondence 1903-1914," *Buffalo and Erie County Historical Society (*Buffalo, NY), folder 1.
[149] Ibid.

[150] William Heath, correspondence dated May 9, 1914. "Larkin A Building Correspondence 1903-1914," *Buffalo and Erie County Historical Society (*Buffalo, NY), folder 1.
[151] Ibid.
[152] Holochek, 253.
[153] Ibid.
[154] The Roycroft and the Shredded Wheat Company were later intertwined through a complicated legal battle, as they fought for rights to use the same corporate logo. Although Hubbard used the symbol as early as 1896, he did not file for the formal trademark papers until 1906, several years after the National Biscuit Company had already been using it as its own logo. The symbol itself likely dates to the Middle Ages, and has been attributed to Cassiodorus, a sixth-century Italian monk who placed this mark on his illuminated manuscripts as a signature for his work. The symbol made its first appearance in 1896 on the cover of Hubbard's first book, *The Song of Songs*. It did not appear exactly as Cassiodorus' emblem, but instead was altered to suit the Roycroft's message. A few years before they merged with the Shredded Wheat Company in 1928, the National Biscuit Company (later Nabisco) began using the symbol as their trademark as early as 1900. The original company logo was nearly identical to the Roycroft's design. The result was a bitter battle over trademark rights, which lasted several years. Despite some unkind words from both sides, the case never went to trial. The charges were dropped against Hubbard in an out-of-court settlement, and both organizations agreed to continue using the trademark, as long as Roycroft, in the words of Perky, "agreed to never make biscuits and Nabisco promised to never publish books."

[155] Ibid.
[156] Patterson, 594.
[157] Harland, 17.
[158] "A Food Factory,"15.
[159] Ibid.
[160] There are many excellent sources on the history of domestic science, but one good place to start is Laura Shapiro, *Perfection Salad: Women and Cooking at the Turn of the Century* (New York: Farrar, Straus and Giroux, 1986).
[161] Holechek, 209.
[162] Ibid.
[163] Holochek, 258.
[164] *Wonders of Niagara*, 22.
[165] Ibid, 142.
[166] Harland, 18.
[167] Tone, 73.
[168] Quinan, 84.
[169] Harland, 18.
[170] *Service Book, The Larkin Store* (Buffalo, NY: Larkin Company, 1914), 10.
[171] Weide, transcript.
[172] Mr. Larkin, interview by WBFO representative, June 10, 1977*,* cassette tape.
[173] *Wonders of Niagara*, 15.
[174] Ibid.
[175] See Marjorie Williams, "The Coffee Break," *Niagara Falls Gazette* (Niagara Falls, NY), November 8 1976.
[176] "Activity is Increasing" *Daily Cataract* (Niagara Falls, NY), February 26, 1901.
[177] *Wonders of Niagara*, 19
[178] "Serves Lunch to all its Employees" *Niagara Falls Gazette* (Niagara Falls, NY), January 15, 1903.
[179] Donald Albrecht and Chrysanhe Broikos, *On the Job: Design and the American Office* (Princeton: Princeton University Press, 2000), 12.
[180] Harland, *17.*
[181] Tone, 142.
[182] ibid, 141.
[183] Nikil Saval, *Cubed: A Secret History of the Workplace* (London: Knopf Doubleday Press, 2014) 27.
[184] Ibid.

[185] Ibid.
[186] *Wonders of Niagara*, 16
[187] Tone, 81-82.
[188] Olivier Zunz, *Making America Corporate, 1870-1920* (Chicago: University of Chicago Press, 1992), 104.
[189] Ibid, 121.
[190] Ibid.
[191] *Wonders of Niagara*, 41.
[192] "Niagara Falls: Two Nabisco Cities," *Nabisco Magazine* (Niagara Falls, NY), July/Aug 1981.
[193] For an excellent analysis of the employee magazine as an instrument of promotion and control, see above works by Marchand and Tone.
[194] Weide, transcript.
[195] Marchand, 104.
[196] Ibid, 105.
[197] "Big Strike on Perky Plant" *Daily Cataract* (Niagara Falls, NY), April 16, 1901.
[198] Publicity Committee, Shredded Wheat Industrial Union, "Plain Statement of Facts: Regarding the Shredded Wheat Strike at Niagara Falls" *Daily Cataract* (Niagara Falls, NY), April 18, 1901.
[199] Tone, 101.

Figure 1
Postcard, c. 1903
Courtesy of Niagara Falls Public Library

Figure 2
Postcard, c. 1902
Courtesy of Niagara Falls Public Library

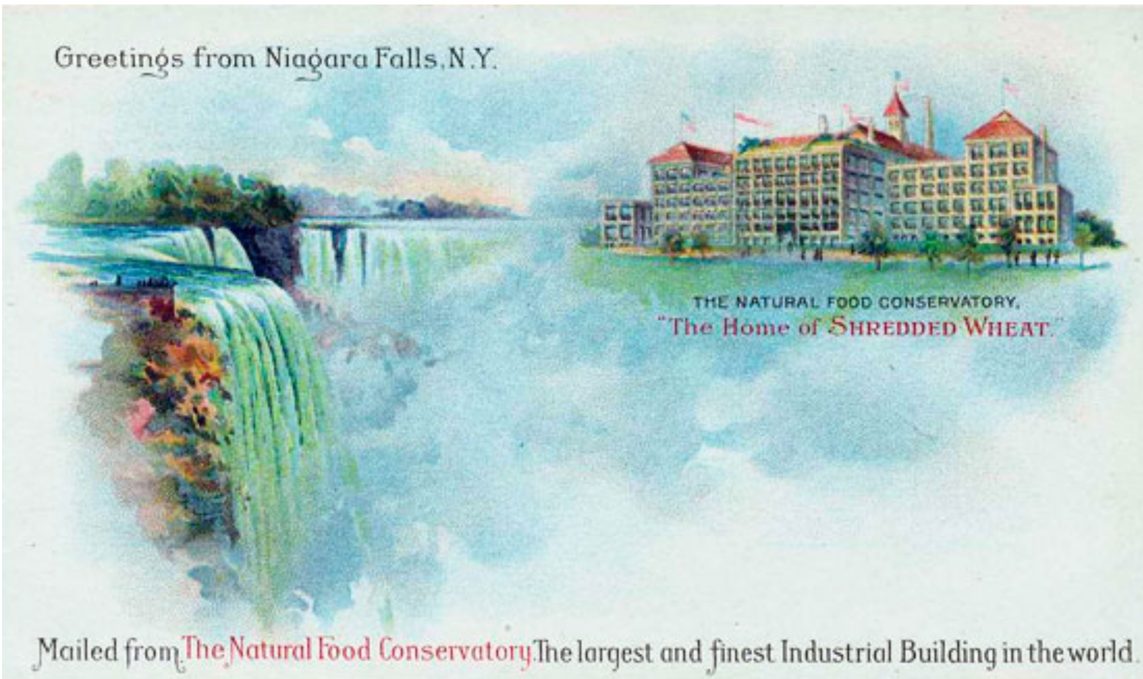


Figure 3
Axonometric view of fifth and sixth floors at the Larkin Adminstration Building. Drawn by James Cahill.
Reproduced from Quinan, 105.

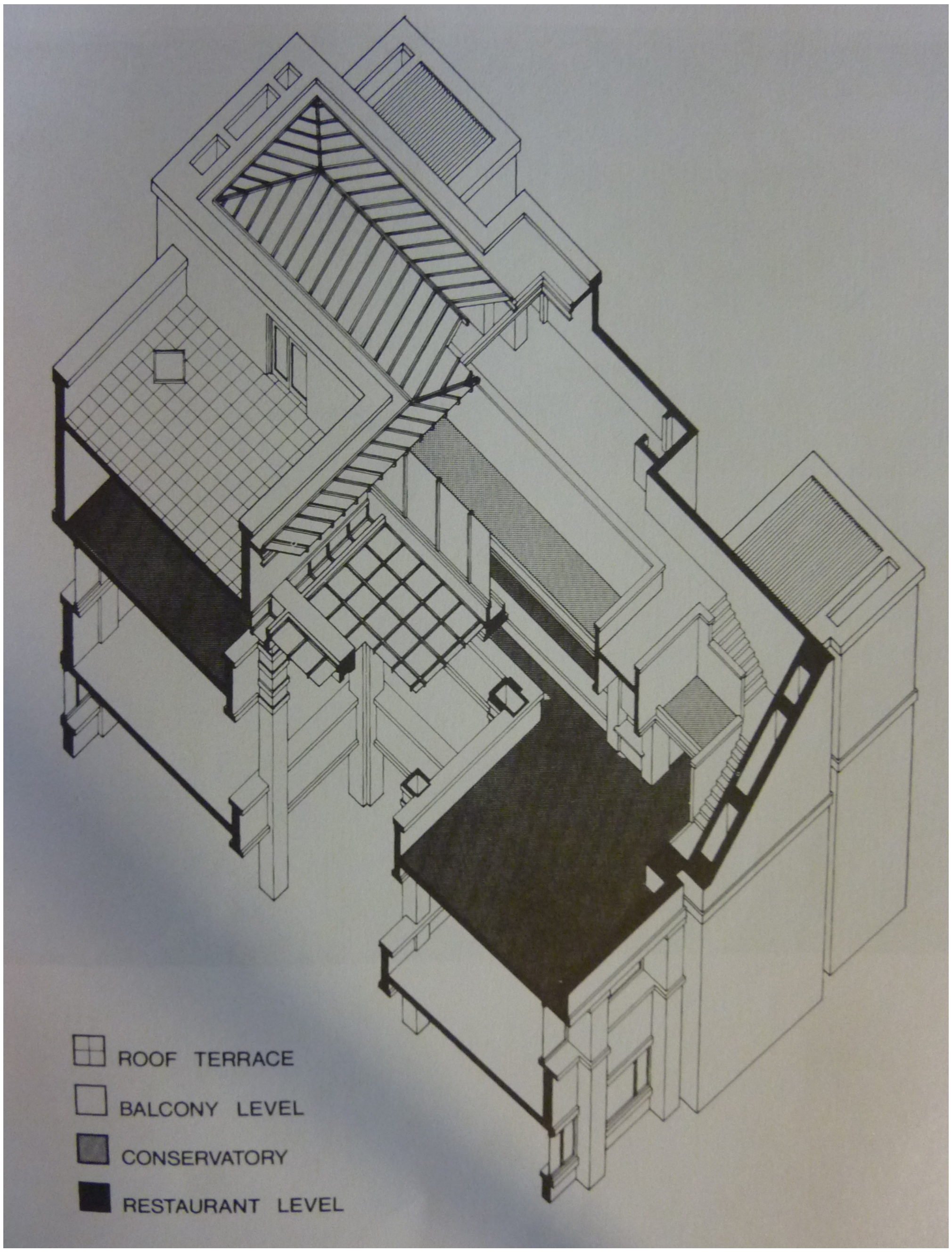


Figure 4
Conservatory, Larkin Administration Building. c. 1910.
Courtesy of Buffalo and Erie County Historical Society.

Figure 5
Raphael Beck, Corporate Seal, Natural Food Company, 1901
Courtesy of Niagara Falls Public Library

Figure 6
Postcard, c. 1905
Courtesy of Niagara Falls Public Library

Figure 7
Postcard, c. 1910
Courtesy of Niagara Falls Public Library

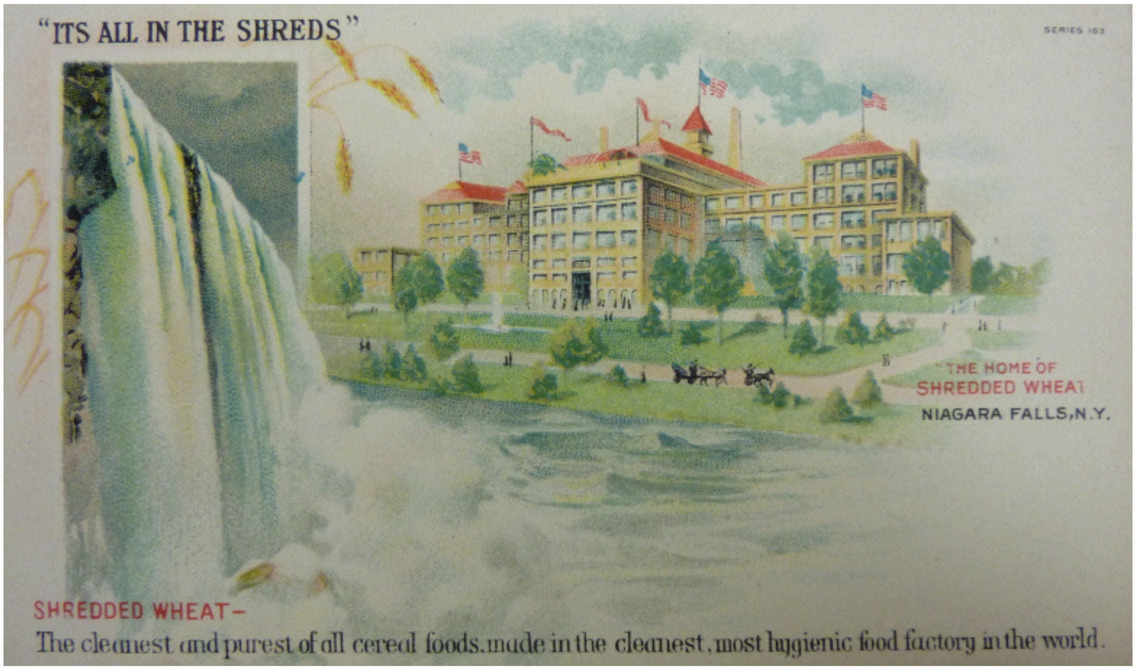


Figure 8
Triscuit advertisement, Natural Food Company, c.1903
Courtesy of Niagara Falls Public Library

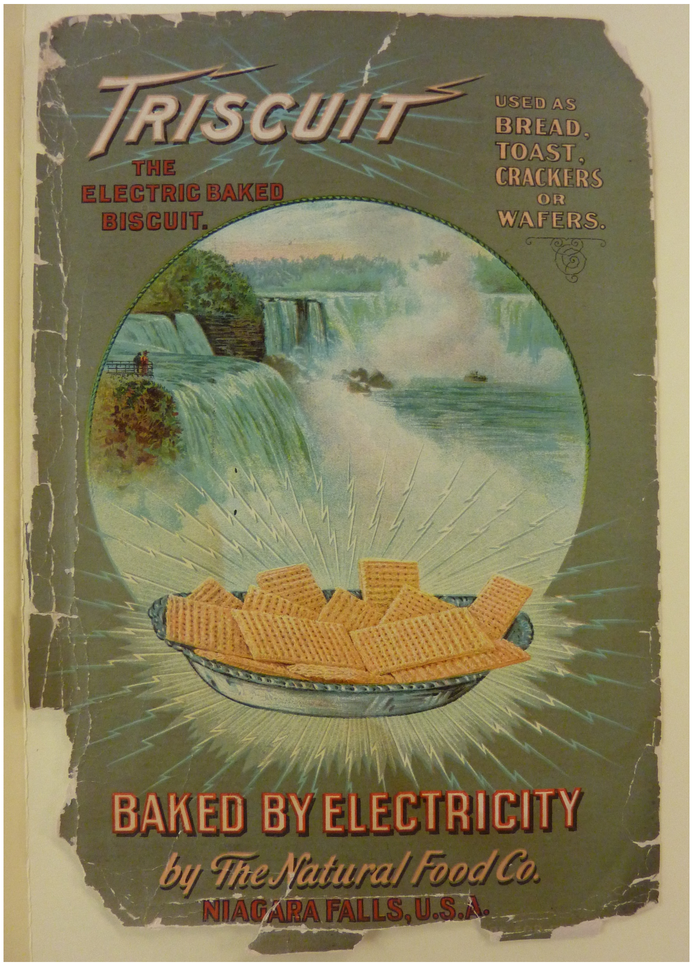


Figure 9
'Shredding Floor.'
From *Wonders of Niagara (*Niagara Falls, NY: Shredded Wheat Company, 1914), 14.

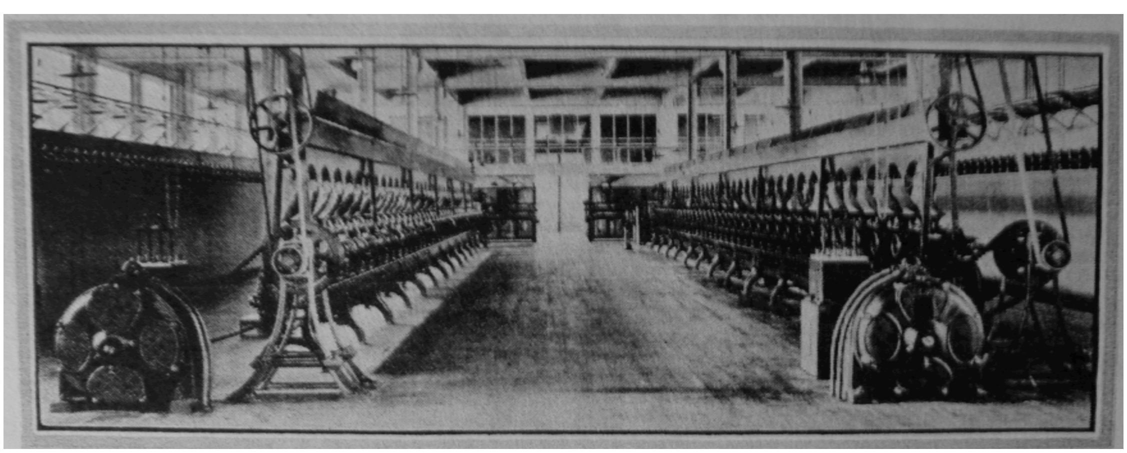


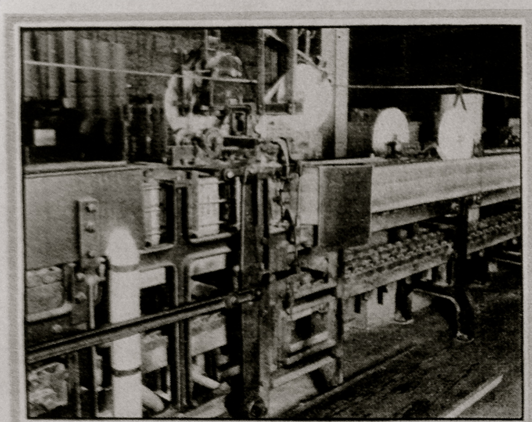
Figure 10
Layout from *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 12.

wooden cases. These cases are made of spruce wood and are nailed together by nailing machines which fasten down the lid at one stroke. The sealing machines are provided with counters which register the number of packages, also with a device which marks each package with a private mark by which the manufacturers are enabled to tell the exact date of its packing.

After the Biscuits Have Been Baked They Are Carefully Packed in Neat Cardboard Cartons Ready for Sealing

The Wonderful Electric Triscuit Ovens

We will now descend to the floor where are located the great Triscuit ovens in which are baked the Company's other product known as "Triscuit", the Shredded Wheat Wafer. Triscuit is made the same as the Biscuit except that it is compressed into a wafer and baked by electricity in a specially devised machine so interesting and wonderful in all



The Machines Which Seal the Biscuit Cartons Are Marvels of Mechanical Ingenuity

Figure 11
Toilet room at the Palace of Light, c. 1914.
From *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 18.

Figure 12
Resting room, c 1914.
From *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 16.

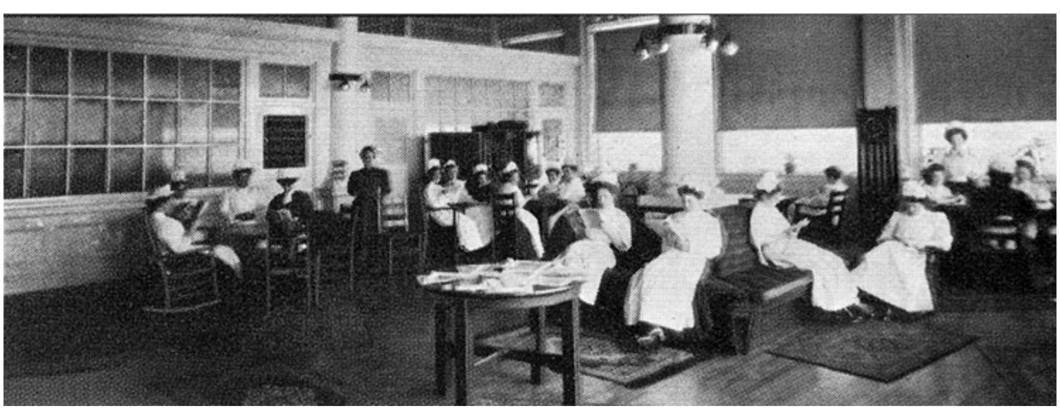


Figure 13
Photograph c.1912
Courtesy of the Buffalo and Erie County Historical Society

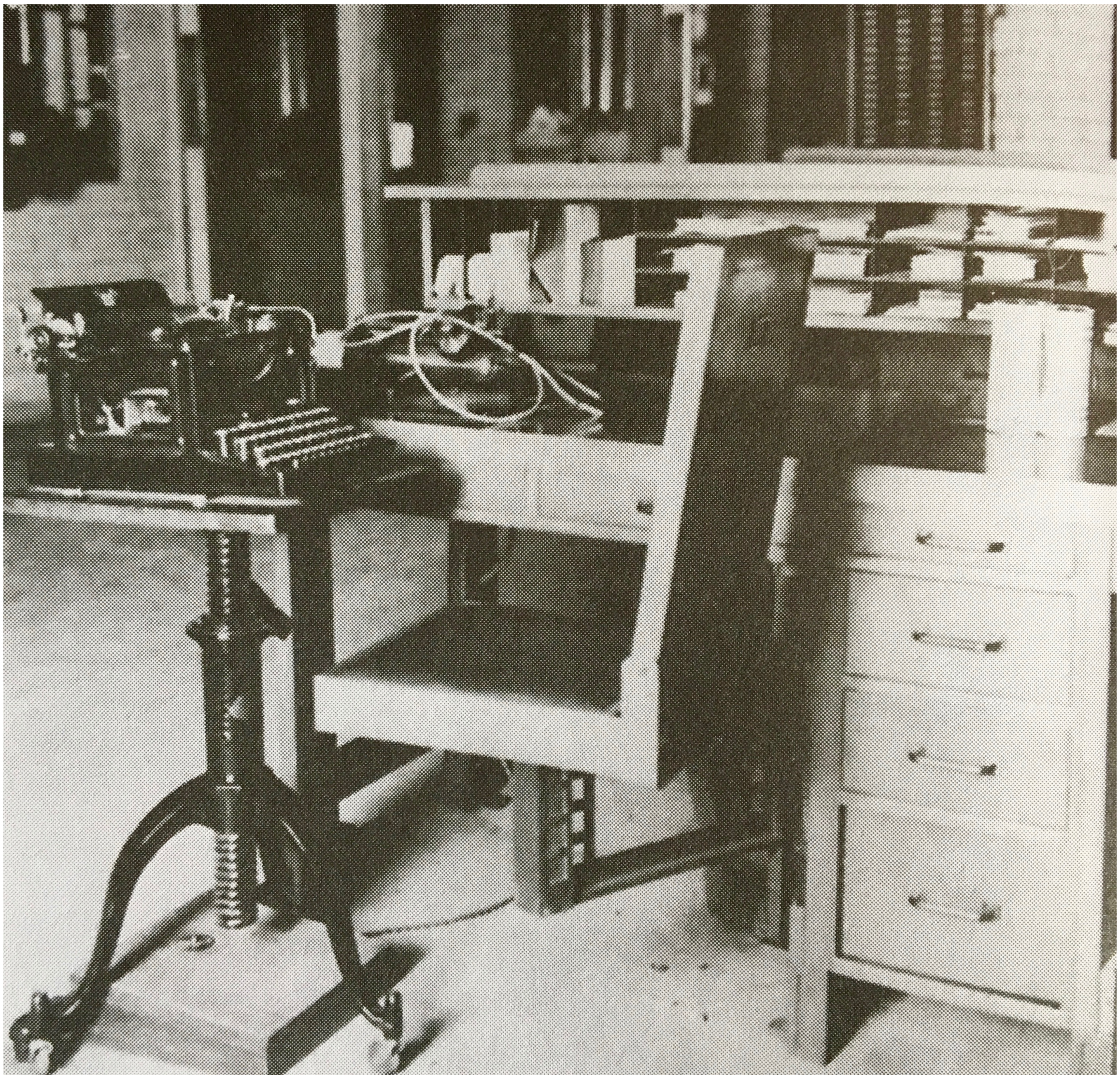


Figure 14
Photograph c. 1920
Courtesy of Buffalo and Erie County Historical Society

Figure 15
Photograph C. 1925
Courtesy of Buffalo and Erie County Historical Society

Figure 16
Lobby at the Palace of Light, c. 1914.
From *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 16.

Figure 17
Roycroft furniture at the Palace of Light, lobby. C. 1910.
Courtesy of Niagara Falls Public Library

Figure 18
Reading room at the Palace of Light, c. 1914.
From *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 20.

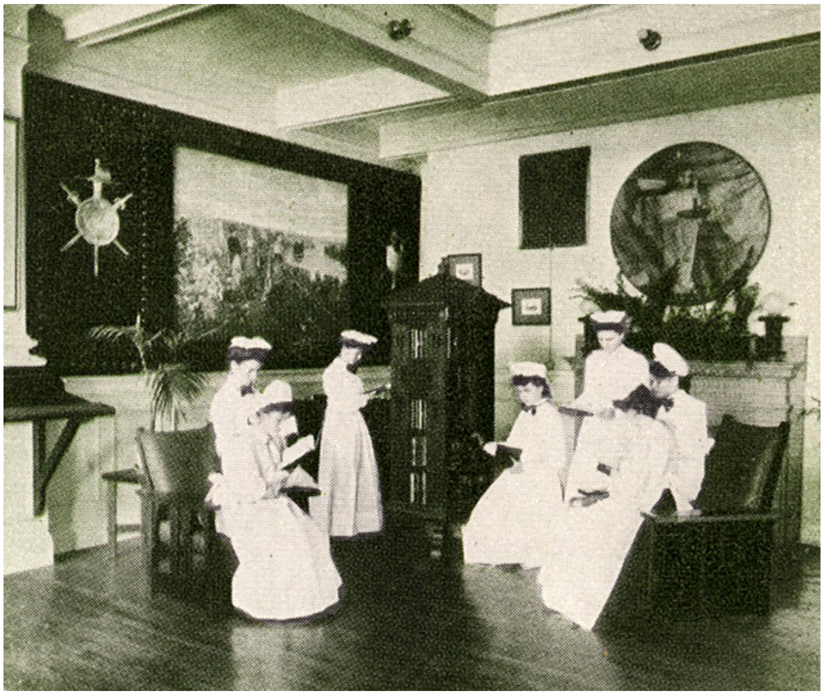


Figure 19
Oread Institute in Worcester MA, postcard, c. 1899
Courtesy of Niagara Falls Public Library.

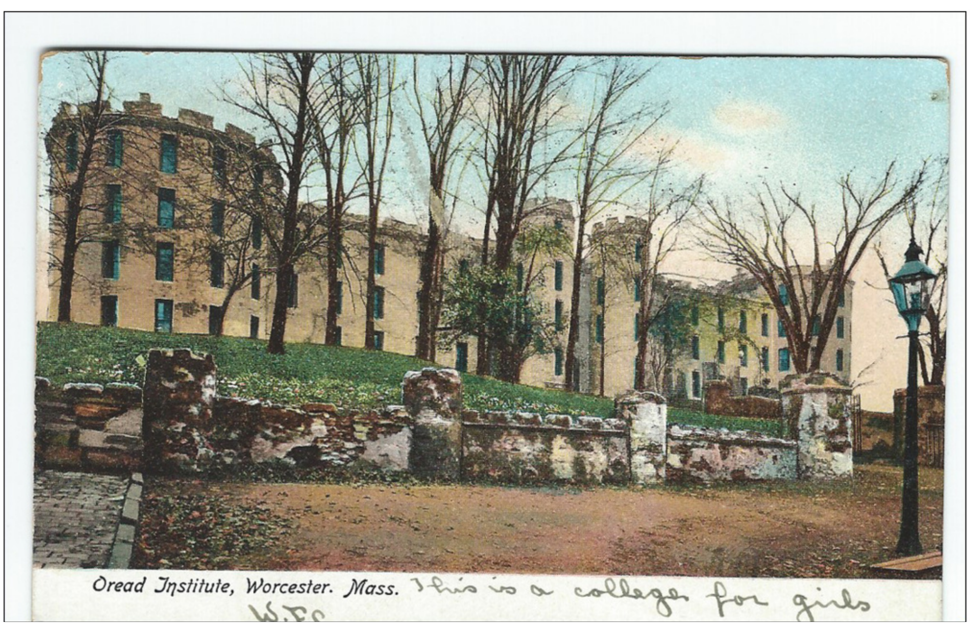


Figure 20
Larkin classroom, annex of Administration Building.
Courtesy of Buffalo and Erie County Historical Society.

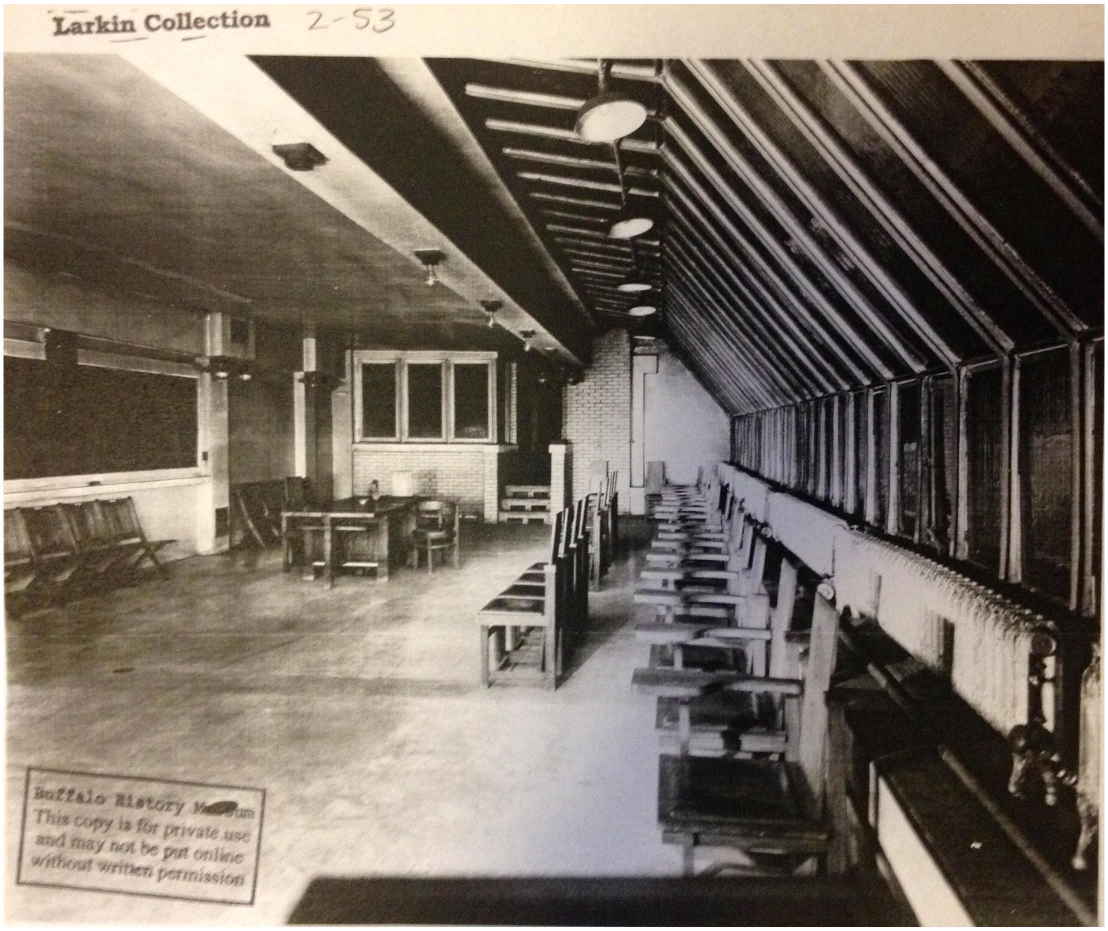


Figure 21
Larkin restaurant, fifth floor, c. 1920.
Courtesy of Buffalo and Erie County Historical Society.

Figure 22
Larkin cafeteria, basement of Building E. July 1920.
Courtesy Buffalo and Erie County Historical Society.

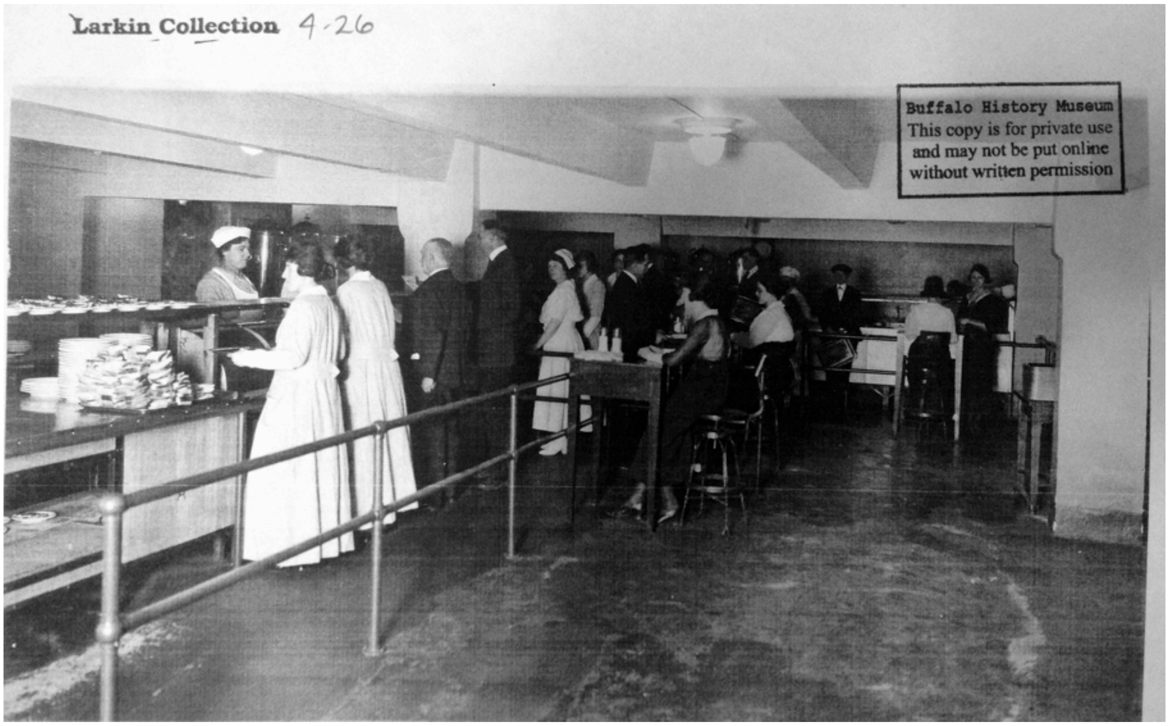


Figure 23
Ladies' dining room at the Palace of Light.
Fom *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 14.

Figure 24
'The Shredded Wheat Family.'
From *Wonders of Niagara* (Niagara Falls, NY: Shredded Wheat Company, 1914), 23.

Three Happy Members of the "Shredded Wheat Family" Presenting the Pretty and Graceful Butterfly Dance At One of the Entertainments Given by the Employees

CHAPTER THREE

Industrial Architourism:

Public Accessibility and Power

Six years before the Palace of Light opened its doors to tourists in Niagara Falls, the construction of the Adams Powerhouse just ten blocks away marked an essential moment in the global history of technology, industry, and architectural design. Completed in 1895, the Adams Powerhouse is generally recognized as the first large-scale power generating plant in the world (Figure 1). Industrial historian F.L. Koethen has identified the Adams Powerhouse as "the birthplace of the modern hydroelectric power station," and this is certainly true in terms of both architectural design and technological innovations.[1] As one of the first of its kind, the Adams Powerhouse ushered in a new type of building that greatly influenced the design of each subsequent powerhouse that emerged in America in the following decades. Furthermore, the Adams Powerhouse was the first to both generate and transmit hydroelectric power from Niagara Falls to multiple industries, businesses, and eventually residences in the Buffalo-Niagara region. Able to supply large amounts of electric power to a multitude of locations, the construction of the Adams Powerhouse enabled the construction of countless other industrial buildings in the region within just a few years. Businesses like the Shredded Wheat Company at the Palace of Light were soon drawn to the region for the abundance of inexpensive power. In this sense, the Adams Powerhouse was a factory for industrial development, serving to not only generate and supply power, but also, in a sense, to produce other factories.

The introduction of large-scale hydroelectric power into the Buffalo-Niagara region, and the world, was marked by a series of sudden technological developments, dramatic visual effects, and even utopian visions of unhindered industrial potential. In short, the new presence of electricity required an adjustment period for the average

American citizen, who “had to be trained to stop fearing electricity and instead consume it.”[2] The architectural design of the Adams Powerhouse played a major role in conveying the benign, safe, and beneficial qualities of electricity at a time when both the general public and professional specialists expressed significant doubts about the impact that this new technology would have on the national landscape, economy, and citizenry. Using a relatively traditional, European-derived scheme of ornamentation, the Adams Powerhouse promoted a civic, institutional exterior appearance that was remarkably different from the progressive technology it contained inside.

Moving past the conservative exterior of the building however, visitors were also invited inside the powerhouse for an official guided tour. On their tour, visitors encountered views of the powerhouse that were carefully constructed to promote and educate the public about electricity. The architecture of the powerhouse played a direct role on these tours, featuring several infrastructural elements that were designed specifically to accommodate, guide and even control tourists. Through this infrastructure, multiple architectural elements influenced the public understanding and interpretation of this new technology as it emerged at the powerhouse. The Adams Powerhouse incorporated this form of architectural tourism almost simultaneously to several other industrial sites in the region, where curious or concerned citizens would enter the building as tourists and often left as consumers. As one of the first major industrial sites to offer public tours in the region, several of the methods and design elements seen at the Adams Powerhouse also emerged in a diversity of other contexts, including the Palace of Light and the Larkin Administration Building.

As new types and styles of industrial buildings began to emerge, architectural tourism played an essential role in assuaging public concerns, gaining consumer trust, and translating factory operations to an increasingly curious citizenry. Tourism is an important, if understudied, venue in which architecture is translated, experienced and understood by the general public. The experiential qualities of architectural tourism, or 'architourism,' are central to understanding the public engagement with industry, yet are also the most difficult for historians to study. Despite this methodological challenge, architourism remains a crucial aspect of architectural history. Yet remnants of tours do persist in some archives, where tour guide transcripts, pamphlets, postcards and visitor scrapbooks can provide insight into the ways in which these trips were constructed. By piecing together these documents and visual ephemera, it is possible to gain a glimpse of these practices that were once so prevalent.

The term 'clarity' again resurfaces in this chapter, with new applications and additional meanings. Examining the architectural quest for clarity in terms of the relationship between structure and communication, this chapter examines the ways in which industrial architecture was designed, inhabited or adapted in order to introduce new technological concepts to outside viewers, the general public, and more specifically tourists. Rather than addressing these buildings primarily in terms of their structural legibility as in Chapter One, this chapter views the ways that this industrial architecture was designed to be, or became, legible to a broader cultural audience. Often serving to translate the value of their industrial products- namely, electricity- to consumers, these industrial structures were designed to make industry itself legible to the broader public.

Poised to attract, guide and educate new groups of tourists, these industrial buildings expressed an aim towards ‘clarity’ in terms of their public accessibility.

For designers, entrepreneurs and tourists alike, industrial architourism existed at the juncture of advertisement, education and entertainment. Architectural education also played a large role in these tours, serving as an essential introduction into how to ‘read’ an industrial building from the outside inwards. Tours attempted to remove the threatening element of mystery in these industrial structures, and instead provide a combination of educational instruction and entertainment value. Although education and advertisement were also part of the motivational aims of industrial corporations, entertainment was likely the primary draw for many visitors attending these factory tours. Architectural design, along with its representation in visual ephemera, incorporated a variety of ways to blend aspects of public entertainment and public education within the context of an industrial space.

This chapter identifies some of the most common architectural elements used to guide, control, educate and entertain tourists at industrial factories and world’s fairs in the Buffalo-Niagara region at the turn of the twentieth century. Although other types of industrial examples are used, the tourist experience of electricity and hydroelectric power generation forms the central focus of the chapter. Developing as an industry of its own at a remarkable rate, the hydroelectric power sector made an immediate impression on industrial corporations and public life. With the seeds of its innovation planted in the bedrock of the Niagara River and Gorge, the development of hydroelectric power made a particularly dramatic impact on the Buffalo region at the turn of the twentieth century. Linked directly to the geography of the area itself, the introduction of electricity at

Niagara Falls and the Buffalo Pan-American Exposition provides rich, multifaceted examples of the ways that tourists culturally absorbed new technology through architectural design.

Divided into two main parts, this chapter first examines the architecture and tourist infrastructure of industrial buildings, and then of industrial exhibitions at world's fairs. The title of Part One, "At the Factories," is arranged in conjunction with the title of Part Two, "At the Fairs," in order to delineate between the interrelated architectural tactics and tourist experiences at these two major categories of industrial displays. While the Adams Powerhouse may not typically be categorized as an industrial factory, it did in fact operate as an industrial enterprise and also inadvertently produced and powered other factories. In this instance, the Adams Powerhouse has been categorized as a factory due to its inherently industrial design and impact on subsequent factories. While the majority of Part One focuses on the Adams Powerhouse as the primary architectural example, comparisons are made with similar touristic infrastructure that appeared at the Palace of Light and the Larkin Administration Building, which were also studied in the previous chapter of this dissertation. In Part Two, the discussion turns to the impact of industrial architourism at world's fairs, with particular emphasis on the Pan-American Exposition in Buffalo. While scholarship on world's fairs is already a well-established field, the architecture and exhibits at the fairs have typically been addressed mostly in conjunction with other fairs, or as exceptional, even isolated, examples.[3] The following discussion instead addresses the inherently linked infrastructure of architourism at the fair and at the industrial buildings that contemporaneously powered the Exposition in Buffalo from Niagara Falls.

Part 1: At the Factories, 1895-1925

The Adams Powerhouse was in many ways a pioneer for the powerhouse typology, but it is essential to first recognize that it was also a product of several preceding attempts at hydroelectric power generation and transmission. While there were examples of hydroelectric power generating plants in Germany and Switzerland as early as the mid-1880s, several precedents also occurred around Niagara Falls. Beginning in the late 1870s, industrial companies began establishing themselves along the banks of the Niagara River and Gorge. Lumber and aluminum manufacturers typically utilized locally-sourced power generated from the river and falls in the form of mills, making Niagara Falls an industrial hub several decades prior to the development of large scale hydroelectric power generation and long distance transmission that occurred in the 1890s. While many industries, mills and manufacturers were drawn to the Niagara waterways, most of the hydroelectric power was only available in the immediate vicinity until the Adams Powerhouse brought with it the ability to transmit power over longer distances.

Innovations at Niagara Falls, 1880-1895

One Niagara Falls entrepreneur, Jacob Schoellkopf, is frequently identified as the first to begin utilizing power generated from the waterfall to operate his mills. Immigrating to Buffalo from Germany in 1843, Schoellkopf first established a successful tannery that was met with considerable financial success, and soon expanded to include locations in Chicago and Milwaukee. By the 1870s, Schoellkopf Sr. used his tannery profits to purchase land in Niagara Falls, where he erected multiple mills that he sold at a profit a few years later. When the adjacent Niagara Falls Canal Company went bankrupt in 1877, Schoellkopf purchased the hydraulic canal at auction, hoping to generate power from the Niagara River and Falls. In 1882 Schoellkopf conveyed his canal holdings to a corporation known as the Niagara Falls Hydraulic Power and Manufacturing Company (NFHPMC), which was the first company to generate electricity from Niagara Falls.

Schoellkopf's company completed the Schoellkopf Power Station Number One in 1881 (Figure 2), and used it to power seven of his own mills located along the high bank of the Niagara Gorge. Acting as President of the NFHPMC, Schoellkopf also built Power Stations Number 2, 3A, and 3B in the late nineteenth century. Generating and selling the power from the powerhouse to other commercial and industrial corporations, as well as to his own mills, Schoellkopf made a substantial fortune during an early, crucial period of hydroelectric development at Niagara Falls. Even Elbert Hubbard, renowned leader of the Roycroft Campus and a surprisingly staunch supporter of electric developments, recognized the pivotal role that Schoellkopf Sr. played in this history, stating, "The honor of first successfully utilizing the power of Niagara Falls for the benefit of man, in a large way, must go to Jacob F. Schoellkopf [Sr.]."[4] Without his investments and leadership at the first Schoellkopf Power Station, many would not have developed hydroelectricity as quickly, efficiently, or early as it historically occurred in Niagara Falls.

While Schoellkopf was able to generate power to use in industries nearby, many entrepreneurs and engineers were still seeking a way to transmit that power over long distances, so that industries were not beholden to a small geographic region. Somewhat simultaneously to the hydroelectric developments at the Schoellkopf power stations, another group of local industrial entrepreneurs worked with several engineers in order to find ways to develop, and transmit, large-scale hydroelectricity at Niagara Falls. In 1886, the Niagara River Tunnel, Power and Sewer Company was established, a corporation devoted to generating hydroelectric power from the river. Led by an industrial entrepreneur named Edward Dean Adams, the company hired Thomas Evershed, an engineer specializing in canals, to find a way to develop and transmit past the Niagara River banks. Commissioned by Adams' company, Evershed grappled with the problem of generating large-scale hydroelectric power for another decade, when he recommended digging a large canal to run parallel to the Niagara River. This canal would run from the upper Niagara River to the lower Niagara River, utilizing the Falls themselves. The canal was intended to function in conjunction with a massive underground tunnel, which would feed several vertical shafts containing turbines to power the factories located above ground (Figure 3). Evershed envisioned the tunnel as a wide, ice proof causeway that would travel over two miles underground along the length of the Niagara River and under the town of Niagara Falls. The tunnel was bored out of solid rock, with eight foot-thick limestone walls that were lined with brick to prevent seepage. During the construction of this 6700 feet-long tunnel, over 600,000 tons of limestone and other naturally occurring materials were removed from the ground, some of which was used to shore up edge properties along the river or was incorporated into the design of new construction such as the Adams Powerhouse. In order to complete this massive feat, 2500 laborers were employed at one time for its construction, which took over two years and drew much attention from the press and the curious public.[5] Construction on Evershed's hydraulic canal and tunnel did not begin until 1890, and was the result of a series of other electrical innovations that arose during the 1880s.

In 1889, the Niagara Falls Power Company (NFPC) and the Cataract Construction Company (CCC) were formed, again led by Edward Dean Adams. These companies were initially established in order to fund and construct Evershed's hydraulic canal, but once Tesla's innovations had proven valuable, the companies soon redirected their plans to construct a central generating plant and to transmit electricity over long distances rather than focusing their efforts solely on the canal. Once the technology had been developed to generate hydroelectric power on a large scale, engineers began seeking a way to transmit this power over long distances. Attempting to engage some of the world's best engineers with this problem, Adams and the NFPC sponsored the "International Niagara Commission" in London in June 1890, offering a prize of $100,000 (worth over 2 million today) for a solution to the issue of transmitting power over distances. Led by Lord Kelvin, the competition continued to encourage several notable engineers and inventors, including Thomas Edison, to grapple with the problem for three years. By 1893, the International Niagara Commission failed to award a winner, but by that time Adams and the NFPC had been convinced that the best system to be employed would rely on alternating current. Developed first by Nikola Tesla and then patented by Westinghouse, alternating current, it was determined finally at the system's display at Chicago's World Columbian Exposition, would offer the best way to transmit electric power over long distances.

The years between 1890-1895 were pivotal in the global history of hydroelectric power generation and transmission, and the majority of this innovative activity occurred at Niagara Falls. Important events in this history occurred in quick succession, and as new technologies emerged others quickly became outdated. Construction on Evershed's hydraulic canal began in 1890, at a time when the NFPC still had not selected a way to transmit the power they planned to generate there. Within just two years, the Evershed tunnel and canal were completed, but it took another year for the NFPC to be convinced that Tesla's alternating current system was the safest, most efficient, and most economical way to transmit power over distances. During this time, the War of Currents raged on between renowned inventors Tesla and Thomas Edison, who raced to develop safe, reliable electricity that could be transmitted over long distances. Working from his New York laboratory in the late 1880s, the famous engineer Tesla invented a motor that used alternating current, rather than Edison's direct current. George Westinghouse, looking to break Edison's electric monopoly and profit, bought the patents for Tesla's alternating current motors, for much less than they soon proved to be worth. Westinghouse's display at the Columbian Exposition of 1893 proved to be convincing enough for the NFPC, and with the recent completion of the hydraulic canal and tunnel, they began moving forward with plans for a power station to generate and transmit the hydroelectricity developed there. Construction began on the Adams Powerhouse in 1894, and by 1895 the building was complete. By November 1896, the first power transmission was sent by alternating current methods from the Adams Powerhouse to Buffalo twenty-five miles away, marking the largest amount transmitted the longest distance of electricity in the world.[6]

The Adams Powerhouse soon inspired similar buildings and power generating methods around the country and the world, creating increased demand for electricity at an exponential speed over the next three decades. After the success of numerous electric exhibits at the Pan-American Exposition in Buffalo in 1901, the Adams Powerhouse soon expanded in order to generate and transmit even more energy from the Falls. Completed by 1903, the Adams Powerhouse Number Two added additional turbines in the following decade, nearly tripling the length of the building. While the first decade of electrical transmission was aimed at providing energy for industries, city services and transportation networks, the American public increasingly adopted electricity into their lifestyles and their built environment in the early twentieth century. As David Nye has observed, “Electrification did not emerge everywhere at the same time,” and occurred in the public, industrial, and residential realms in various stages, with cities utilizing electricity far earlier than suburban or rural areas.[7] In 1905, for instance, fewer than ten percent of American homes were wired for electricity, but on the eve of the Great Depression approximately seventy-five percent were, including almost all urban dwellings.[8] While industries adopted electric power in the 1890s, Nye wrote, “the major shift to electricity in the home occurred between 1915 and 1929; however, electric lighting already had dominated public spaces for 20 years.”[9] As power generating methods and machinery constantly improved to meet increased demand during this time, many of the earliest power stations were considered outmoded after only a decade in operation. The Adams Powerhouse managed to evolve alongside these innovations for several decades, but even then it was outmoded by the late 1920s, when it was relegated to a standby facility. The Adams Powerhouse was officially decommissioned in 1961, and by that time there were much larger, more advanced facilities that had been built in the region to meet the demand. As a result, the majority of the buildings on the NFPC grounds were demolished in 1965. The Adams Powerhouse Number One (1895; henceforth referenced simply as 'Adams Powerhouse') and Adams Powerhouse Number Two (1903) were both demolished at this time, while the Transformer House (1903) remained extant, serving only as equipment storage for the Union Carbide Company after that time.

Designing the Powerhouse

From its very inception, Adams and the NFPC aimed to build a powerhouse that would mark an important civic contribution, rather than a more perfunctory technological one. Essentially the first building of its kind, the Adams Powerhouse established many architectural patterns that would continue to appear decades later in subsequent American power stations. While many of the structural choices made in designing the building reflect the technical requirements, climatic limitations and mechanical operations of the power-generating process, the Adams Powerhouse also exhibits numerous architectural elements that attempted to address cultural, rather than purely practical, concerns. As the first building to develop this type of design, the Adams Powerhouse set an important precedent that, for the most part, continued to emerge in powerhouses across the nation over the next three decades.

The exterior of the Adams Powerhouse conveyed the appearance of tradition, stability and institutional grandeur. Located directly over the power-generating wheel pit, the building essentially formed the tip of the iceberg for this massive operation, which stretched over 130-feet underground directly beneath the building (Figure 4). The three-and-a-half story limestone building formed a T-shaped plan, stretching five bays on the north elevation with the main entrance and eighteen bays on the gabled -roof east and west elevations. A fifteen-feet tall and fourteen-feet wide window was the main character defining feature in each bay, flanked by stone pilasters and topped with a stone voussoir-style rounded arch. Together these windows form the bulk of the elevation, banded together in an arcade of fenestration that added a vertical element to the otherwise predominantly horizontal extension of the building. A thin band of smaller clerestory windows ran the perimeter of the roofline for additional ventilation. At the building's north end, a five bays wide and three bays deep addition with side-gabled roof provided the main entrance, marked by a double-wide door under a large stone tympanum. Overall, the exterior of Adams Powerhouse Number One (henceforth: the Adams Powerhouse) featured grand, Beaux-Arts inspired proportions, noble ornamentation in a style simultaneously reminiscent of the Richardsonian Romanesque style, and unified, rhythmic facades befitting an institution.

The Adams Powerhouse was also part of a larger site that continued to expand over the next decade (Figure 5). Along with the first powerhouse, the Transformer House was also constructed in 1895, which served primarily as the center for dispersing and transmitting alternating current power. Designed in tandem with the first powerhouse, the exterior closely resembled the other building, exhibiting a similar rhythm of bays with arched windows and stone pilasters. Executed in the same limestone, the transformer house echoed the powerhouse, although it was smaller in size and different in function. More modest in ornamentation than the powerhouse, the transformer house resembled a smaller version of the same style. This stylistic affinity was continued a few years later in 1903, when the company decided to expand due to increased demand. Constructing another building in the same style, the design for Powerhouse Number Two echoed the materiality, fenestration and proportions of the other two buildings on the complex. By this time, the complex was complete, with all three buildings, Powerhouses Number One and Number Two and the Transformer House, on the property facing the inlet and the Niagara River in a park-like setting. Further expansion occurred on the site in 1911, when another 300-feet were added to the length of Powerhouse Number One in order to accommodate more turbines for increased production. The uniform rhythm of bays on the original portion of the structure enabled this expansion to occur relatively easily, as the south wall was demolished and the elevations were extended in multiple identical bays to accommodate the new equipment. While the erection and expansion of buildings occurred in a series of stages from 1895-1911, all of the buildings were designed by the same architectural firm, McKim, Mead and White, in order to ensure an aesthetic unity that was visually consistent throughout the entire complex.

Adams selected the renowned architectural firm of Charles McKim, William Mead and Stanford White to design the powerhouse as early as 1892, before the mechanics of the alternating current system it would utilize were even finalized. The uncertainty of the inner workings of the powerhouse at this point seems to have caused little interference with McKim, Mead and White's design at the time. As in many powerhouses that followed, there was a clear division of labor between engineers and architects in designing this building, with engineers typically focusing on the inner mechanics of the powerhouse and architects typically designing the exterior shell of the building. As a building designed to house mostly machines, rather than people, the interior contents, layout and technology of the powerhouse was in some ways separate from the exterior walls and ornamentation. This division between interior and exterior, between modern technology and traditional architecture, and between engineers and architects, marks one of the most important dichotomies that emerge in nearly any study of a powerhouse, and many types of industrial buildings, at the turn of the century.

By choosing McKim, Mead and White to design the powerhouse, Adams and the NFPC made a calculated commitment to erecting a building that would be far more institutional than industrial in appearance. Renowned for their work on institutional buildings and wealthy residences, McKim, Mead, and White had never designed any type of industrial building prior to the Adams Powerhouse. Given the firm's lack of experience in this realm, the choice to hire these architects to design the world's first large-scale powerhouse may have initially seemed bold. Separating the function and design of the interior and exterior, however, enabled the NFPC to delegate the task of conveying a benevolent public appearance to the architects. McKim, Mead and White, in this sense, were perfectly suited for the task. Despite their lack of experience with industrial buildings, their reputation for Beaux Arts inspired civic architecture made them particularly well suited, oddly enough, to design this powerhouse.

By the time the NFPC hired McKim, Mead and White in 1892, the firm had already gained recognition for their many large civic and residential buildings. Most of their projects occurred on the East Coast, such as Madison Square Garden (1890) and the Washington Square Arch (1892) in New York and several mansions in Newport and Boston. Adams had been acquainted with their work since at least 1884, when he purchased a unit in the firm's Villard Houses in New York. Shortly after that purchase, he hired the firm to design his country mansion in Long Island in 1887. Known more commonly as Rohallion, the large residence at 45 Bellevue Avenue was designed in the Shingle Style, with a carriage house in the same style with a clock tower that was much like the firm's Newport casino.[10] Adams' familiarity with the firm's work, coupled with their widespread reputation for large institutional buildings, likely informed the NFPC's decision to hire McKim, Mead and White in 1892. Historian William Irwin has recognized the important role that the firm's reputation and prior experience played in securing the commission for the powerhouse, stating, "The very fact that the power developers hired such a renowned firm demonstrated their concern not only for aesthetics but also for the symbolic significance of the power plant."[11] By hiring McKim, Mead and White, Adams and the NFPC ensured that the powerhouse would be perceived by the public as far more than a perfunctory industrial building.

'Attractive, Protective, and Instructive'

As President of the NFPC, Adams was largely responsible for working with McKim, Mead and White in order to bring this vision to fruition. In a publication he later wrote on the development of the powerhouse, Adams identified three major qualities he hoped that McKim, Mead and White would convey in their design. He stated, "Here were three important considerations in the design of the powerhouse; it should be attractive, protective and instructive."[12] In many ways, these three qualities were visibly present in the final design and construction of the Adams Powerhouse, as well as in the other two buildings on the property that followed. Taking a closer look at the ways that each of these three qualities manifested in the architecture that resulted from this commission reveals the architect's role in translating this entrepreneur's vision. Adams' desire to apply these three qualities in the first place, however, reveals a much more intricate web of cultural concerns that accompanied the introduction of large-scale electric power into American society at this time. Simultaneously articulating, addressing and assuaging public misgivings and curiosity about this new industrial presence, the architecture of the Adams Powerhouse was specifically designed to encourage the absorption of electricity into a new national lifestyle. Envisioned as a way to attract, protect, and instruct the general public about the way electricity was generated, transmitted and even used from its very inception, the Adams Powerhouse was designed to function as much like an educational museum and entertainment attraction as it was to be a fully-operational industrial facility.

Emerging seemingly overnight, the sudden and dramatic appearance of electricity marked a change that, as historian Ginger Strand observed, required "more than infrastructure; it was a nationwide behavioral modification...it required reeducation."[13] Even before the long distance transmission of alternating current electricity was introduced at the Adams Powerhouse in 1895, Americans had witnessed a number of startling events related to electricity. During the War of Currents in the 1880s, Edison attempted to discredit Tesla's alternating current method by electrocuting dogs on road shows, spreading a negative reputation of this type of electricity across the nation. This reputation was further tarnished when New York State switched the death penalty method from hanging to electrocution, where the nation watched as a convicted man was killed in the first electric chair in Auburn in 1890. Events like these continued to terrorize the public perception of electricity even after the Adams Powerhouse was built, when Edison performed sideshow feats such as electrocuting an elephant at Coney Island in 1903.

Performative acts like these, coupled with the inherently complex scientific nature of electrical technology, provided an impetus to the NFPC, who needed to reassure the public that electricity was not only safe, but also worthy of purchasing and using in their own cities and homes. Adams' three design aims for the powerhouse therefore also directly aligns with three major ways of changing the public opinion of electricity: by making it appear visually attractive and also attractive for consumption, by instructing the public on how it works, and by ensuring citizens that it would be safe. The Adams Powerhouse itself established these methods in its architectural design. These three characteristics were present on the exterior of the powerhouse, which used stylistic cues to assure a nervous public that electricity could provide a benign and even beneficial impact on society. Each of these qualities were simultaneously reflected in the company methods employed in tours through the building as well as in the architecture of the powerhouse itself.

Beginning with the first of Adams' specifications for the powerhouse, the desire to make the building attractive was rooted in far more than purely aesthetic concerns. The word 'attractive' certainly applied to the aesthetic qualities that Adams hoped McKim, Mead and White would convey in the building's design, but it also addressed another primary concern that was related to the cultural reception of this new industry. While engineers, scientists, and innovators like Tesla had been grappling with the task of generating and transmitting electricity for several decades, these efforts remained mostly relegated to specialists. At the time that the NFPC and Adams Powerhouse emerged in the early 1890s, therefore, the concept of electricity was still largely foreign, mysterious, and technically complex to the general public. In this sense, the introduction of large-scale electric power generation and transmission marked an important moment not only in the history of science and technology, but also in the cultural history of American society. This introduction occurred for, arguably, the first major time at the Adams Powerhouse, where the combination of new technology and a nationally recognized natural site ensured the country would be watching this phenomenon from near and far.

In making both the powerhouse and electricity itself attractive, nature played a major role in assuaging the public that this modern innovation would utilize, rather than abandon, the sublime forces of nature that had already made Niagara Falls a tourist destination. The Niagara Falls Power Company, as the world's largest manufacturer of hydroelectricity at the time, had to sell the idea of electricity to the public, and in this attempt, Niagara Falls was key. In the decade leading up to the construction of the Adams Powerhouse, Niagara Falls had become a controversial site in local, regional and national eyes. As entrepreneurs began recognizing the immense potential for hydroelectric power in the Falls, conservationists and preservationists fought to defend their natural state. Aiming to prevent businessmen from diverting too much water from the Falls, notable figures such as landscape architect Frederick Law Olmsted, artist Frederic Edwin Church and architect H.H. Richardson formed the Free Niagara movement in the early 1880s.[14] As industrialization and commercial development threatened to encroach upon Goat Island and many other areas surrounding Niagara Falls, conservationists advocated for the State of New York to purchase, restore and preserve the scenic lands of Niagara Falls. Deeming their conservation efforts "a sacred obligation to mankind," the Free Niagara movement attracted significant attention in the press.

Others resisted Free Niagara, arguing that the sublime power of Niagara Falls would be best expressed in the electricity it could generate through modern industrial methods. Even Elbert Hubbard, founder of the Roycroft Arts and Crafts community, advocated for utilizing as much of the water for hydroelectric power generation as possible. He wrote, "Niagara is wonderful, but the place will not be really worth visiting until the cunning of man's brain has utilized every horsepower of that falling weight for the Service of Man."[15] Businessmen and governments invested in the potential of hydroelectric development often spoke of the waterfalls, "as if it were a faucet to be turned on and off according to aesthetic whim."[16] The result of these debates, of course, was compromise. The Falls did not run dry, nor did they maintain their 'natural' state, which was of course already impacted by thousands of tourists, attractions and manmade industries lining the Niagara Gorge and River decades before Free Niagara was formed. With the design assistance of Frederick L. Olmsted, Calvert Vaux and hydraulic canal engineer Thomas Evershed, the Niagara Falls Reservation was formed in 1885, making it the first State Park in the nation.[17] At this time, the NFPC was strategically established just outside the boundaries of the Reservation, which Evershed himself created, to utilize hydroelectricity from amounts of water that were regulated by the State of New York.

Directly related to the historic context of these debates, the design for the Adams Powerhouse attempted to assure the public that the building could coexist with, and even enhance, the natural splendor of Niagara Falls. Recognizing that the powerhouse should be aesthetically pleasing because of the public interest in conserving the scenic beauty of Niagara Falls, the building was designed to blend into the surrounding landscape. Constructed of locally quarried limestone that had been excavated from the Evershed tunnel below ground, the powerhouse was designed to harmonize with the materiality of the surrounding Niagara gorge. Rough trimmed to avoid a sense of handmade intervention, this limestone masonry appeared to rise directly from the earth, thereby echoing the surrounding landscape. Perhaps in partial homage to Richardson's involvement in the Free Niagara movement, McKim, Mead and White paid tribute to their former mentor in their choice of building material and its direct connection to the landscape. Furthermore, the building was situated on an industrial campus within plenty of manicured green space, which one trade journal described as "almost like a park."[18] Landscape design was a common attribute of early industrial designs, where massive powerhouses, tunnels and penstocks were directly integrated with the surrounding trees, vegetation, and gorge side rock formations. In doing so, "power advocates stressed that one of the most reassuring aspects of the Niagara venture was in fact its limited impact on the landscape."[19] Using elements of landscape design in tandem with the materiality of the limestone, McKim, Mead and White's design for the powerhouse reflects the NFPC's clear concern for presenting a beneficial, even interdependent relationship between the natural wonder of Niagara Falls and the modern marvels of hydroelectric power generation.

Rather than detracting from the landscape or depleting Niagara Falls of its beauty, some critics even argued that the Adams Powerhouse enhanced the scenery of its surroundings. As part of an entire edition of *Cassier's Magazine* devoted to the many power generation stations at Niagara Falls by 1909, engineer Frank Koester reflected,

> There exists a feeling, not only among the general public, but also among many engineers and architects, that the development of water power necessarily destroys the beauty of the surrounding locality; but this assumption is

> by no means correct...there are exceptions which prove very clearly that the effectiveness and beauty of the scenery may be improved by the erection of the buildings of a hydro electric plant.[20]

Citing the Adams Powerhouse at Niagara Falls as an example of this architectural ability to integrate industry into an inherently natural landscape, Koester identifies the tension that historically existed between nature and electricity during the decades surrounding the construction of the Adams Powerhouse. As Irwin has observed of the Adams Powerhouse, its architectural design reflects "an attempt to monumentalize the power venture and yet subsume it within the natural landscape."[21] Although seemingly at odds with one another, these two aims consistently reemerge in several aspects of the design for the Adams Powerhouse.

The use of limestone was also instrumental in conveying a sense of solidity, reassuring the public that this new technology would be dependable, safe and long lasting. Acknowledging the importance of safety amongst his priorities, Adams stated, "The power-house should be *protective*, invite confidence and afford shelter."[22] Having established that the Adams Powerhouse would be attractive, Adams also wanted to ensure the building would convince skeptics that it was safe to enter. Combating corporate distrust as well as public skepticism of the physical safety of the building, the use of limestone, "connoted permanence, stability and also protection, which was a crucial foil for the highly speculative venture contained within."[23] Much like a large bank executed in thick, heavy masonry, the use of limestone reassured viewers that the building, and the financial endeavor it represented, was secure, stable and safe. This interest in conveying a ‘protective’ appearance to viewers indicates the NFPC’s attempt to assuage outsiders that the corporation, like the building itself, could be trusted.

A Civic Institution

While the rough limestone materiality of the building suggested an attempt to convey a somewhat humble, respectful relationship with nature, the proportions and exterior ornamentation of the powerhouse boasted an institutional presence. The solid, even bulky qualities of the massing were softened by the presence of plenty of two-story windows banded together in an arcade running around the perimeter of the building on all sides (Figure 6). Although these two story windows were horizontally interrupted by additional stone arches for structural support, the height and prominence of these windows set a precedent for future powerhouses, which would later eliminate these interruptions entirely. Richardsonian Romanesque inspired details adorned these character-defining windows at the Adams Powerhouse, delineating them with two-story pilasters topped with thin square capitals. Rounded arches topped each window, executed in voussoir stonework. While these decorative elements were relatively simple compared to some of the powerhouse architecture that followed in the coming decades, McKim, Mead and White established a precedent for the typology in their use of Richardsonian Romanesque style ornamentation. With little function beyond adorning the support system for the large windows, these decorative elements point to the attempt to convey the powerhouse as a civic-minded institution rather than a private business endeavor.

Although the Niagara Falls Power Company was a private, industrial corporation that generated and transmitted electricity for profit, the use of these architectural elements suggested otherwise. Particularly when viewed in the context of the mounting apprehension about electricity expressed in the years leading up to the Adams Powerhouse, the presence of these stylistic elements reveals an attempt to use architectural ornamentation to persuade the American public that this enterprise would benefit all. The Adams Powerhouse architecturally emphasized this sense of public service, rather than private profit, through the Richardsonian Romanesque forms that previously appeared primarily on institutional and residential buildings. Although he did not contemplate the true motivations for this type of design, architect Donald Des Granges identified an aesthetic interest in powerhouse exteriors by 1929. Adorned with decorative details befitting a public library, museum, or school, the Adams Powerhouse exterior suggested to the curious public that this enterprise was an institution designed for their benefit. Already becoming a stylistic pattern by that time, established at least in part by the Adams Powerhouse itself, Granges noted, "A civic consciousness is being developed among some of the public utilities, so that they take pride in their buildings... which add very materially to the good impression which the public has of these large corporations."[24] Observing the civic-minded appearance of several powerhouses by that time, Granges reflected, "Like great railroad terminals, power houses are being looked upon as institutions of public service. Therefore, a certain architectural dignity to give the impressiveness demanded of semi-public buildings is being required."[25] Linking powerhouses to this style of civic architecture also echoes Richardson's own associations with libraries, train stations and Trinity Church. Even as early as 1909, general circulation magazines such as *Literary Digest* began to recognize the architectural resonance between powerhouses and public institutions. In a rare article devoted to the increased presence of powerhouses in American cities, one critic wrote, "Beauty is truth, and truth is knowledge, and knowledge is power. A powerhouse, therefore, should be as beautiful as any other public structure- say an art gallery or a public library."[26] Linking power to beauty, this statement reflected and encouraged the general opinion that powerhouses were a unique type of structure that should be designed as a semi-industrial, semi-institutional building type that could serve the public, even when motivated by private profit.

The monumental qualities of the Adams Powerhouse both reflected and encouraged a broader shift in national identity that accompanied the introduction of large-scale hydroelectricity at this time. As Nye has suggested, the shift to water-derived power, rather than steam and coal-fueled power, marked an essential moment in crafting American identity. Diverging from the British methods of steam and coal power, the introduction of water power at Niagara Falls, much like its smaller-scale precedents in the New England textile mill industry, catalyzed the creation of a new type of industrial building and landscape. Recognizing "American industrialization would not be based on the steam engine as in England," Nye observed the impact of hydroelectric power on creating a distinctive national environment, where "the British and American industrial systems thus produced distinctive landscapes."[27] These distinctive landscapes resulted from the inherent differences of their natural locations along American waterways, but also from the different architectural requirements of building an industrial site based on waterpower rather than coal power. When no coal towers, bins or messy piles were necessary, Irwin argued, “the building could remain a harmonious entity.”[28] By replacing stacks of coal with machines, wheels and switchboards, one critic argued, “The possibilities of giving a hydroelectric plant a superior architectural appearance are much greater than in the case of a steam power plant, because there is no handling of coal and ashes and no production of smoke.”[29] Freed from the environmental restraints of coal, the water-derived power plant was able to embrace a less cluttered, sooty appearance than a coal plant. This in turn enabled engineers and architects to devote considerably more attention to the overall appearance of a hydroelectric powerhouse than to a steam-powered plant, resulting in a variety of differences between the American and British building types and landscapes.

It was no coincidence that this shift in American industrial prowess, towards water-derived power and away from coal, emerged for the first time on a large scale at Niagara Falls. As perhaps the most famous natural attraction in America by that time, the area was uniquely suited for not only providing the power itself, but also linking it directly to the national landscape. By the 1830s, “the experience of Niagara had become a cliché,”[30] and was thus already well established as an iconic tourist attraction for both American and European visitors by the 1890s. Niagara Falls was intricately weaved into national identity by that time, as the foremost emblem of America’s natural wonders and seemingly wild landscape. European visitors who conducted their own form of ‘Grand Tour’ of America typically traveled from New York along the Hudson River, through the Catskills, Lake George and along the Erie Canal to culminate in viewing Niagara Falls.[31] The typical European visitor in the mid-to-late nineteenth century “comes to America, as a sight-seer, knowing that the principal things seen will be the people and the natural scenery. He hastens to Niagara Falls, and rests there long enough to study and enjoy thoroughly the incomparable features of the region."[32] Niagara Falls was envisioned as a uniquely American site, incomparable to Europe in that "even Europeans themselves recognized it had absolutely no counterpart in the Old World."[33] As it was already admired as a site of natural power for centuries, Niagara Falls thus formed the perfect location to transition the concept of 'Americanness' from one of nature to one of industry. The harnessing of Niagara, as it was often called, for hydroelectric power therefore ushered in a new wave of American associations. Powerhouses and other nearby industrial buildings, such as the Palace of Light, soon lured visitors to other aspects of Niagara Falls, serving as tourist attractions in their own right. Over time, it was these power plants, as Irwin argued, "rather than nature, that came to symbolize America."[34] The Adams Powerhouse debuted these concepts to the world in 1895, marking an early moment in the transition from a national identity rooted in nature to one rooted in industry that was derived from nature.

The desire to make powerhouses aesthetically pleasing and institutional in nature often seems to have hinged upon the application of European-inspired ornamentation to an otherwise inherently American industrial invention of hydroelectric power generation. When articles on the subject did appear in architectural journals, they tended to describe them in relation to European examples. Pointing to the Adams Powerhouse at Niagara Falls, one article grappled with the seemingly contradictory notions of national pride regarding the American harnessing of electricity in combination with the desire for a more traditional, European form of architectural ornamentation. Koester reflected, "Industry will drop her unsightly mask when water drives her wheels. The Niagara powerhouses give us a good inkling of this possibility; but would we see its fruition, we must turn to Europe."[35] Lamenting American manufacturers' "love of ugliness," Koester seems to have longed for a more aesthetic approach to powerhouse design as early as 1909, where, in his view, "American business seems to have gained a striking victory over beauty."[36] While he acknowledged the valiant efforts made at the Adams Powerhouse, Koester, like other critics that followed, turned to Europe for a more aesthetic vision of powerhouse design. An article in the *New York Evening Post* similarly expressed regret that, "While Europeans are housing their electric power plants in palaces, ours in America occupy structures that look like jails."[37] *Literary Digest* admired European examples as well, stating, "Hydroelectric stations in Europe have in fact been so built as to be appropriate to the locality and pleasing to the eye."[38] Many critics identified the Municipal Powerhouse at Geneva, Switzerland as an example of the aesthetic potential they hoped designers, specifically architects rather than engineers, would bring to powerhouses in the United States. Describing the Geneva powerhouse, the *New York Evening Post* marveled at the building, where "stretching along the pool whence comes its strength, it pleases the eye more than many an art gallery."[39] Despite these European inclinations, other American architects, critics and industry professionals defended a simpler façade for powerhouses. As Koester stated, "A powerhouse should not be too ornate, such as is often the case in Europe; simplicity in design and harmonious arrangement, taking into account the surroundings, are matters of prime importance."[40] Advocating for an unadorned, more structurally honest design, Koester echoed the design aims for powerhouses that were often more associated with engineers than with architects.

Hiring an architect, in addition to the requisite engineers, seemed to be the best way to ensure that a large-scale powerhouse could become a showpiece for civic-mindedness rather than solely a perfunctory industrial structure. Adams and the NFPC set the precedent for this practice in Niagara Falls, but it still did not become commonplace to hire an architect to design powerhouse exteriors for several decades. Before the Adams Powerhouse, Irwin reflected, early power stations, such as the Schoellkopf Power Station, "suffered from architectural neglect."[41] Even in the years that followed, few powerhouses were built by architects, let alone a firm as prestigious as McKim, Mead and White. The majority of powerhouse commissions thus remained primarily in the hands of engineers. Historian John Stilgoe addressed this slow adoption of powerhouses to be designed by architects, stating, "Only a rare nineteenth century powerhouse received the attentions of architects, but by the late 1920s, electric companies regularly employed such designers to help engineers make new power stations beautiful."[42] While there are a few notable exceptions to this rule, such as McKim, Mead and White's second design for a powerhouse in Manhattan for the Interborough Regional Transit (IRT) company (1904; Figure 7), Stilgoe's observation rings true. Articles on powerhouse design are virtually nonexistent in professional architecture journals until the late 1920s, and even then they were few and far between. Stilgoe located only a few articles on powerhouse design in this type of journal between 1880-1930, and my own research has confirmed the same. Powerhouses did appear, however, in plenty of engineering journals, where professionals debated technical specifications regarding the relationship between machinery and structural matters, proper ventilation requirements and interior details at length. Journals such as *Engineering Record* and *Power*, the latter specifically devoted to powerhouse design, machinery and other related equipment, provided the most thorough, but also the most technically-oriented, material on the building type as early as the 1890s.

In contrast to the aesthetic opinions expressed in many architectural journals, engineers contributed another view on the ornamental treatment of powerhouses in their own professional journals. In an article fittingly titled, "Common Sense in Engineering," engineer J.E. Aldred expressed his views on powerhouse design in *American Machinist*, by making a direct comparison of the Schoellkopf Power Station and the Adams Powerhouse. Although the article appeared in 1920, over two decades after both of these buildings had been completed, Aldred had recently traveled to Niagara Falls to tour them both in person. After visiting both, Aldred remarked "I was at once impressed by the difference between these two enterprises."[43] His impressions of the two powerhouses reveals a strong contrast between these two opposing points of view, often echoed in the traditional divisions between the values of engineers and architects, and between function and ornamentation.

Viewing the Adams Powerhouse as excessively lavish and ornamental, Aldred outlined his preference for the design of the Schoellkopf Power Station. While he recognized the pleasing aesthetic qualities of the former, where he recognized that the "celebrated architects...designed this as a show plant," he also recognized that the grounds would be "expensive to upkeep."[44] The cost of construction also factored into Aldred's preference for the Schoellkopf Power Station, which he viewed as far more economically considerate than the Adams Powerhouse, where, "Everything about the enterprise indicated a lavish expenditure and a disregard of economy."[45] Prioritizing economic efficiency over aesthetic appeal, Aldred instead preferred the more practical approach utilized by designers at the Schoellkopf Power Station, where they had exhibited, “in every respect, the opposite inclination.”[46] There, Aldred stated, engineer Wallace Johnson had “shown great economy and common sense in the general way in which he had met the requirements.”[47] Seen at the lower left corner of Figure 2, the façade of the Schoellkopf Power Station presents a uniform rhythm of bays with rectangular windows stretching along the banks of the Niagara River in order to feed power to the mills above. Unadorned by stylistic elements such as formal columns or decorative sculpture, the Schoellkopf Power Station reflected the functional simplicity of its design. Taking particular care to discuss Johnson’s design of the hydraulic power generating system, Aldred admired the decision to keep the waterwheels and generators above ground, within plain view, rather than running them underground as at the Adams Powerhouse. While the Adams Powerhouse hid these operations from sight underneath the building by utilizing a more expensive design, at the Schoellkopf Power Station (Figure 2), “the waterwheels and generators, and the water, after passing through the wheels, simply spilled into the river at the lower level.”[48] To some this industrial tumble of water may have been an eyesore, a reaction suggested at least in part by the decision to hide this process from public view at the Adams Powerhouse. Aldred and his engineer readers, however, valued Johnson’s “desire to simplify problems and apply sound reasoning and sense to the carrying out of every part of the work,” far more than the aesthetic choices that were made at the Adams Powerhouse.[49] Aldred’s introduction to Johnson’s work at the Schoellkopf Power Station proved profitable in the following years, when Aldred later hired him to design and manage the Shawinigan Water and Power Company in Canada.

Aldred's preference for the economically efficient, functionally designed and relatively unadorned Schoellkopf Power Station points to an important division of labor that emerged in the design process for powerhouses in the late 1890s. As noted before, the choice to hire an architect to design the aesthetic elements of the building alongside an engineer, who was devoted to more technical concerns, reveals an important separation of tasks. Early powerhouse examples such as the Schoellkopf Power Station were sufficiently, and even gracefully, designed solely by engineers with little to no significant input from an architect during the process. The introduction of an architect into this process, marked by that of McKim, Mead, and White at the Adams Powerhouse, suggested a new direction for this building typology. Reflecting a mounting concern amongst entrepreneurs to make their powerhouses 'attractive,' the choice to hire an architect infused a new aesthetic sensibility into an otherwise inherently industrial building.

Industrial Cathedrals

This stylistic marriage between exterior ornamentation and interior functionality was often the result of the division of labor between architects and engineers during the powerhouse design process. By 1911, one engineer advised, "The engineer must make the outline design and layout of the power house, leaving the architect to clothe the structure and cooperate with the engineer on the question of foundations."[50] While this separation of structural and ornamental duties is more typical of an early twentieth-century view of the distinctions between the professions of architecture and engineering, the division of these tasks is certainly evident in many powerhouses, including the Adams Powerhouse. Where the height specifications, ventilation requirements, and material structure of the buildings inside reveal the careful attention paid by engineers to ensure the machines would operate efficiently and safely inside, the exterior decorative details seen in the form of columns, capitals, spandrels and arches serve as evidence of a more architectural inclination on the part of the designer. This division of interior and exterior, delegated to engineers and architects respectively, can be seen even more clearly in subsequent powerhouses, including the Interborough Rapid Transit (IRT) Powerhouse in New York where, "the basic planning of the structure was left to the engineers, but when it came to the exterior they bowed to Stanford White."[51] The resulting effect of this division of labor, it seems, was a combination somewhat unique to powerhouses amongst other industrial building typologies, where "early electric power plants often benefitted from more elaborate architectural treatment than typical industrial buildings of the same period."[52]

On an aesthetic level, the desire for monumentality likely played a role in the grand proportions seen in late nineteenth and early twentieth-century powerhouses. Beyond the technical specifications designed to accommodate the climatic and spatial restrictions of various machines, dynamos and transformers, powerhouse designs also tended to address aesthetic concerns a bit more directly than other industrial buildings did. By the 1920s, architects such as Granges began to identify this concern for visual appearance amidst the otherwise mechanical requirements of powerhouse designs. Advocating that architects work together with engineers to incorporate visually pleasing elements into an otherwise functional design, he stated, "We should depend today on mass, beauty of proportion, and relations of voids and solids together with texture and color to obtain the effects for which we are striving."[53] Those 'effects,' it seemed, stretched far beyond merely satisfying the spatial and climatic requirements of the machines inside, and instead reached towards aesthetic aims.

Ventilation was also a primary concern in powerhouse design, as substantial heat was generated when these large industrial machines operated virtually nonstop. Powerhouse designers published their concerns for accommodating the climatic conditions of these machines, stating, "cleanliness, good ventilation, good lighting, and good drainage are essential... Good ventilation is especially necessary, so as to prevent the acid fumes from escaping into the engine room or other parts of the power house."[54] The substantial height of all powerhouses provides evidence of this concern, where buildings like the Adams Powerhouse and the IRT Powerhouse soared multiple-stories high and were virtually uninterrupted by floor divisions inside. By placing these machines at ground level with extremely high ceilings, powerhouse designers ensured that plenty of uninterrupted vertical space would enable heat to dissipate as it rose. Furthermore, a band of clerestory windows provided plenty of ventilation near the roofline of the building, allowing heat to escape from the building as it rose to the top. Yet these proportions were far more than purely functional, as the soaring heights of powerhouses exemplified the exaggerated proportions that appeared in response to aesthetic concerns for these industrial buildings. Designed to be pleasing to tourist's eyes and curious onlookers, these ornamental qualities served a cultural purpose rather than a structural one.

Exemplifying the aesthetic concern for exterior appearance, the arcaded rows of tall, arched windows at the Adams Powerhouse was one of the most pronounced characteristics of its design. These windows may have been primarily an aesthetic choice rather than solely a structural requirement. The tall windows on the exterior of the Adams Powerhouse exemplify the application of these aesthetic values to this industrial building typology, setting into motion a design example that many subsequent powerhouses would follow. As in many other powerhouses, the elongated windows at the Adams Powerhouse did provide some ventilation where they opened in small parts, and also enabled heat to dissipate a small percentage due to the relative thinness of glass compared with brick. More importantly, however, the windows also provided a great amount of natural illumination, flooding the building with light on all sides. By 1903, McKim, Mead and White inserted an uninterrupted span of windows into the Transformer House when they added the building to the NFPC campus (Figure 8), indicating the progress in their design towards larger windows. By 1904, the firm had more completely eliminated the interrupting stone arch supports from the vertical emphasis of the windows at the IRT Powerhouse, accomplishing an uninterrupted multi-story span of windows in each bay. Many powerhouses across the nation continued in this tradition, where windows soared multiple-stories high uninterrupted by any horizontal divisions.

The Schoellkopf Powerhouse (Figure 9) in Buffalo for instance, owned by the son of Schoellkopf Jr. and constructed in 1917, featured bands of large, three-story windows wrapped around the entire perimeter of the building. Designed over twenty years after the Adams Powerhouse, the Schoellkopf Powerhouse in Buffalo exhibits many architectural features that emerged earlier in Niagara Falls. The windows proved to be the primary feature of this powerhouse, uninterrupted by any horizontal divisions as had initially appeared at the Adams Powerhouse. Bringing McKim, Mead and White's vision for a tall, light-filled powerhouse to fruition, the Schoellkopf Powerhouse structurally amplified, and ornamentally simplified, many of the design features initially present on the Adams Powerhouse exterior.

Essentially forming a wall of windows with thin brick piers and arches for support, the proportional relationship of glass to stone on the Schoellkopf Powerhouse exterior is certainly reminiscent of a Gothic cathedral such as at Chartres or the Sainte Chapelle in Paris. Using brick piers and spandrels to support large spans of glass, the construction at the Schoellkopf Powerhouse prioritizes the presence of windows on its exterior elevations, placing high value on natural light and transparency. This comparison diverges, however, in the recognition that the Schoellkopf Powerhouse, like the Adams Powerhouse, employed rounded arch Romanesque-style windows, rather than the traditionally pointed arch Gothic-style ones. This divergence, however, could be rooted in a combination of factors, including the American affinity for the Romanesque encouraged in part by renowned architects like H.H. Richardson. Additionally, considerable structural and material advancements have certainly been made since the Gothic era, where steel and masonry structural support systems developed by the early twentieth century no longer required buttresses or similar systems in order to support large spans of glass, effectively rendering the pointed arch more of a stylistic choice than a structural one by that time. Furthermore, these Romanesque associations may have conveyed a more rugged, and less refined, character that was more befitting a powerhouse than the skeletal, ethereal qualities of the Gothic style. Nonetheless, the similarities between a thirteenth-century cathedral and an early-twentieth-century American powerhouse are striking when viewed in this comparative context, as their elevations expressed a mutual preference for ethereal glass walls to let in plenty of natural light. Light, it seemed for both types of buildings, was the ultimate source of power.

At the Schoellkopf Powerhouse, as well as the Adams Powerhouse and IRT Powerhouse, the monumental scale of windows is a bit puzzling, particularly when one considers that these buildings were surely able to generate enough electric light to be able to function inside without them. While the windows did provide some opportunity for heat dissipation, they often did not fully open, or even open at all in some case, indicating that their inclusion was likely an aesthetic choice rather than a purely practical one. Additionally, powerhouse designers went to great effort to ensure that these long rows of large windows would be sufficiently supported by a series of relatively narrow piers, columns and arches. In this sense, these window arcades were likely included to emphasize the monumental scale, and importance, of the technological achievements and machinery housed inside. Particularly given the public concern over the impact of electricity, steam power and industrial technology on both the natural and built environment, the presence, style and scale of these windows would have provided a reassuring touchstone of traditional cultural values amongst an otherwise modern entity. A familiar architectural language, present in the Romanesque forms of arches, columns and spandrels, ensured that the powerhouse would not be too threatening to suspicious passerby. Nye has similarly identified the careful attention paid to the exterior of powerhouses for this very reason, stating, "Since the public primarily experienced only the exteriors of these buildings, seen from automobiles or passing trains, each plant was designed to convey a large scale magnificence."[55] Initially visible to the curious public only from the outside, before tourists were first admitted, McKim, Mead and White first adopted many of these pre-established modes of using traditional ornamental motifs to soften the otherwise inherently modern function of these industrial buildings.

Furthermore, tall sets of elongated windows at these powerhouses would have reassured outside viewers, at some level, that the processes within did not completely disavow nature and instead operated in the presence of natural light. Surrounded on all sides by windows, the Adams Powerhouse generated electric light within view of plenty of natural light. This architectural message, equating light with power, would have been particularly potent at a building that was effectively the first large-scale hydroelectric power plant in the world. When viewed in this context, these windows could be considered far more than a perfunctory choice, and were instead a largely aesthetic response to weave together traditional architectural forms with modern industrial practices. Historian Aaron Wunsch has identified this blend of tradition and modernity in powerhouse architecture, stating,

> One might regard the power stations as a successful form of hegemony, in which a business legitimized itself by embracing a style with no obvious associations to its particular technology or even to industrialization...in order to cultivate an image of refinement and civic virtue but also to integrate a powerful source of change- electricity.[56]

In this way, the architectural ornamentation of the Adams Powerhouse exterior aimed to unify some sense of tradition with the innovative technology housed inside. Many identified the monumentality of the building, suggesting that the building "stands as a monument to the greatest single step in advance that was ever taken in the electrical field."[57] Yet in conceiving of the project, "Adams and his associates also considered the power house a futuristic scheme. Past methods and experience, they felt, could shed little light on this project."[58] This progressive thinking resulted in two seemingly opposing design approaches to the powerhouse, wherein a futuristic power-generation scheme was clad in an inherently traditional, ornamental exterior. Although in many ways the development of hydroelectricity at the Adams Powerhouse represented a break with the past, the traditional appearance of the exterior may have been implemented in part as an attempt to create a sense of temporal connectivity between the past and the future. Designed as a monument to American industrial technology, but executed in Romanesque-inspired terms, the Adams Powerhouse thus resembled an industrial cathedral that served as an architectural homage to the great power of light.

Touring the Industrial Institution

While the design of the Adams Powerhouse partly resulted from the mechanical specifications required by the power-generating equipment housed inside, the presence of several other architectural elements indicates a clear concern for shaping the tourist experience of the building as well. Even before the building was completed, Adams expressed concern during the design phase that the powerhouse would be visually appealing to tourists. Envisioning how it would appear on promotional materials, Adams stated, "The souvenir pictures carried away by the visitors should include one or all three of the power-houses."[59] Similarly, Niagara Falls tourist promoters and power developers, "proudly publicized each new step in harnessing Niagara as positive events worthy of...offering delights to tourists."[60] Indelibly linked to the other tourist attractions of Niagara Falls from its very inception, the Adams Powerhouse was conceived of as a tourist destination even before its doors opened.

Once the building was completed, far more tourists began to visit the powerhouse than the company had initially anticipated. As the Niagara Falls Power Company struggled to provide visitors with a sufficient tour, "The problem of how to care for the visitors who came to see our power development was one that received considerable thought during the first year or two of operation."[61] In response, Adams suggested, "Provisions should be made for the admission of the public without danger to themselves and without interruption to the service, and for intelligent and helpful guides who would explain the methods of utilization and distribute the literature provided."[62] Far more tourists began during the first year of operations, and this surprise required some reconsideration of the role that visitors would play at the building. As Adams revealed, "As soon as Power-house Number One had been erected and its first turbo generators were in operation in 1895, the number of visitors at the powerhouse greatly increased, and special attendants became necessary for their guidance and protection."[63] Although it has been difficult to obtain a firm number of how many tourists visited the powerhouse in its first few years, some NFPC documents suggest the numbers were in the hundreds or thousands. Little records were kept regarding tourists in the first five years, further suggesting that the company did not anticipate the amount of interest that tourists would express in the beginning.

This interest dramatically increased at the turn of the twentieth century, when the Pan-American Exposition in Buffalo featured electricity as its main attraction and thus led many tourists to explore the source of this energy at Niagara Falls. With approximately eight million visitors attending the exposition in Buffalo, at least one million made the trip to Niagara Falls while in the region. During their visit, many tourists flocked to not only the great cataracts themselves but also several of the tourist attractions in the area, including the Palace of Light. The Adams Powerhouse, as the primary source of this electric power and transmission, would certainly have drawn many of these tourists to its doors. While this event would have likely given the Adams Powerhouse considerable momentum as a tourist destination, public interest in the building continued long after the exposition was over. On a single day in 1926, for instance, Adams recorded 3246 visitors entering the powerhouse.[64] By that time, he stated, the company had hosted over 80,000 tourists that year alone.

Unlike other industrial sites such as the Palace of Light, however, the Adams Powerhouse did not have a firm tour program in place when it first opened, and the first years were marked by a system of trial and error. Although certain tourist infrastructure, such as an observation gallery, had been built as part of the initial powerhouse design, official documents indicate that the company had not identified a systematic tour process or program by the initial opening of the building. When scores of tourists began entering the building in its first year, it became clear to NFPC officials that a more streamlined and consistent tour program was necessary. While some engineers were tempted to eliminate the tourist program altogether, dismissing it as a distraction, “It was found impracticable to exclude them altogether for obvious reasons. On the other hand, for reasons of personal safety they could not be admitted freely to the plant without competent guides."[65] In response, the NFPC created a small department devoted to providing tours throughout the building. By the late 1890s, Adams stated,

> The requests for permission to inspect the plant of the Niagara Falls Power Company are so numerous that it is impossible for the officers of the company to give individual attention to such requests. The company desires however, to afford its visitors every reasonable facility for the gratification of the interest that is taken in its works, and to this end has provided competent guides for the purpose of conducting visitors through the establishment.[66]

In 1900, the company began charging a twenty-five cent admission fee to tourists, in order to "defray the cost of the guides and door keeper" that this new system required.[67] This admission fee enabled tourists to visit the building with a company-sponsored guide, available six days a week during regular business hours. After defraying the cost of the guides, however, the remainder of the money received for these admission tickets was, "used for the benefit of the employees-for beds in hospitals and in other ways."[68] A portion of these proceeds went to providing employee health care, where a bed was maintained at the local hospital specifically for NFPC employees. Having raised over $46,000 for this employee benefit program and fully defrayed the cost of the guides, the NFPC eliminated the admission fee for tourists in 1918, and tours remained free henceforth.

In addition to making the powerhouse both an 'attractive' and 'protective' place for tourists, Adams also hoped the building would provide an educational experience. In his instructions to McKim, Mead and White, he stated, "the power-house should be *instructive* and afford a demonstration and an exhibition."[69] The building had to be designed in such a way that, as Adams envisioned, "the myriad of tourists who came to Niagara Falls could safely visit [the Powerhouse] and come away with an understanding of the processes involved."[70] In response to this, several architectural elements were included into the design of the building, mostly on the interior, in order to accommodate the presence of tourists. Observation galleries, specific walkways and paths through the buildings, and scenic views served primarily as tourist infrastructure at the powerhouse, with little purpose other than serving to guide, instruct and control visitors. By taking a closer look at each of these infrastructural elements at both the powerhouse and at other industrial sites nearby, it becomes clear that these architectural components were designed to control visitors' perception of the powerhouse, the company that owned it, and the technology it utilized. At the Adams Powerhouse, many viewers likely left the building with only a limited, surface-level understanding of the incredibly complex operations that generating and transmitting electricity required. In this sense, the architourist infrastructure at the building was designed to provide only the impression of an educational encounter with the building, rather than a truly instructive scenario. Designed to control as well as instruct, these physical elements corralled tourists onto a pre-determined path. This path provided an intangible, experiential glimpse into the inner workings of the building that illuminates many of the ways in which architectural tourism shaped the public perception of electricity and industry henceforth.

Entering the building from its main entrance, the overall impression of the interior space would have been one of a singular large, open space filled with machines. The entrance itself was "so large in proportion that during construction loaded cars could pass through it into the main room of the power house."[71] Opening into a large, cavernous space with tall ceilings, the main room housed the majority of the machines, switchboards and technology used to control the generation and transmission of power.

Figure 10 illustrates the main interior of the building, which also corresponds to the long portion of the building seen from the exterior in Figure 1. As seen in Figure 10, this interior space was mostly uninterrupted by floor divisions, and thus the sheer volume of this room would have been immediately evident to visitors. At the clerestory level, a "50-ton traveling crane transferred the machinery for the turbines from the cars to their location in the wheel pit."[72] A number of steel trusses ran along the roofline for additional support, enabling the crane to move as well as providing additional support for metal walkways along the perimeter. The machines contained in the main room, however, were likely the main attraction for tourists, rather than the architecture itself. Originally, ten generators were installed on the ground floor, plainly visible in the center of the main room. These machines, along with the turbines, would have likely attracted the most immediate attention and curiosity amongst visitors, as they may have seemed "remarkable for their simplicity as well as for the enormous power they are capable of developing."[73] While this room formed the bulk of the interior space, the east wing of the building was cordoned off, and visually deemphasized in order to provide office space. These offices occupied four floors, creating interior vertical divisions unlike the large open space of the main room, and were only accessible from the ground floor by a modest doorway located adjacent to the high arched main entrance to the building.

The Observation Gallery

The tourist impression of this interior space, however, would have been seen only from certain angles. Like most of the photographs of this space that survive, including Figure 10, the room would have been seen from an idealized perspective, floating above the floor on an observation gallery constructed specifically for that purpose. Entering through the office door, visitors typically gained access to their tour path by climbing two flights of stairs to a second-story observation gallery. Acting as a bridge that crossed the main room of the power station at the second story level, the observation gallery enabled the tourists to float above the machines in operation below. Built of exposed iron with handrails, the walkway ran along the edges of the interior walls and crossed the main floor towards the south end of the building. Although the visitors were led by a guide on their tour through the building, the infrastructure itself circulated them throughout the powerhouse on a connected circuit of elevated walkways, delineated pathways and other observation points. Through this system of tourist pathways, "the interior design of the powerhouse ushered visitors to convenient viewing platforms," that linked together to provide a clear and calculated path through the building.[74]

The installation of this second-story observation gallery indicates the use of architectural elements specifically for tourist purposes. With no functional relationship to the machines and operations, this observation gallery served no purpose other than to provide a safe space for observing the processes below. The inclusion of this observation gallery in the Adams Powerhouse therefore reflected a growing interest in providing distinct spaces for tourists in an otherwise purely industrial building. Designed to separate the tourist from the machines below while still making them visually accessible, the observation gallery provided a glimpse down into the powerhouse from above.

Notably, very few direct images of the observation gallery at the Adams Powerhouse have survived. Official company-sponsored photographers do not seem to have been encouraged to focus on the presence of the observation gallery from ground level, and as these are the majority of images that have survived, this absence is as telling as its presence would be. Official images instead appear to have utilized the observation gallery for its photogenic views, as in Figure 10, which was taken from the elevated walkway peering down onto the main floor much as a tourist would have done. Reproducing the view that would have been seen by a tourist, rather than depicting the presence of tourists themselves, official photographs like Figure 10 repeated the carefully crafted angle of vision that the company encouraged through the observation gallery itself. By depicting views from the observation gallery rather than of it, official photographs echoed the tourist experience that occurred at the powerhouse rather than offering an alternative view. Images of the powerhouse taken from this angle were reproduced in several venues over the next twenty years, appearing in company-published pamphlets and publications as well as in professional journals and general circulation magazines. Rarely seen from ground level as a worker would have encountered the space, elevated images of the powerhouse interior were by far the most common angles presented in various publications. Reinforcing the visual and physical tourist experience of the powerhouse, these images, like the observation gallery itself, played an important role in defining the typical angle of vision with which outsiders would come to interpret the building and its processes. In doing so, the observation gallery both literally and conceptually elevated their view of the complex industrial processes that occurred within the building.

The elevated walkway, or observation gallery, became increasingly common at several industrial sites in the late nineteenth and early twentieth centuries. As industrial corporations became increasingly influential in American politics, factory tourism served a crucial function in the early twentieth century. Designed primarily for manufacturing purposes and only secondarily for aesthetic ones, industrial structures seemed particularly illegible to many citizens. Those who did not work in them rarely encountered factories, unlike more publicly accessible buildings such as museums and churches. During this time, “Work inside the factory became a mystery to many Americans, a thing apart from ordinary life.”[75] Countering this aura of unfamiliarity, industrial corporations distributed images of their factories on postcards, cereal boxes and pamphlets- but it was the tours that allowed the public to gain the best understanding of these spaces. Tourism thus played an essential role in demystifying these factories, smokestacks and warehouses for a curious audience. Tours addressed multiple objectives by inviting the public into the factory, which often served as the only experience of industrial architecture, or even electricity, that the middle and upper classes would have in the early twentieth century.

Observation galleries were one of the primary ways in which industrial architecture served to accommodate, guide and even control the presence and impressions of tourists who visited sites like the Adams Powerhouse. Elevated above the main working spaces, filled with machines and workers, the observation gallery was perhaps the single most important and most common architectural element that united industrial tours during this time. The tourist practice of watching other people work emerged, at least in this incarnation, in the late nineteenth and early twentieth centuries. As industrialization created new production spaces and laboring lifestyles, outside curiosity about these environments was coupled with increased leisure time for some classes. Factory tours became a way of reconciling this new relationship between work and leisure, turning work into entertainment -for those who could afford to visit factories on their vacation time. The wide-ranging implications of this practice illustrate a complex shift in the cultural conception of work. In this sense, it can speak volumes about this moment of heightened public awareness, demonstrating recognition of the impact of factories on daily urban life.

In his seminal book *The Tourist,* sociologist Dean MacCannell devotes considerable attention to the intersection of work and leisure in tourism. His study of early twentieth-century Parisian tours of workplaces ranged from the slaughterhouse to the stock exchange, and is particularly relevant for this discussion. MacCannell viewed this moment in history as a time when work and leisure were mutually displaced through tourist practices. Tours that featured 'work displays,' which were typically some form of public observation of workers in process, conflated the boundaries between work and leisure. He called this process 'alienated leisure,' a term he gave to viewing work displays, and argued that it only emerged because work was no longer the central feature of modern society, thus allowing people to gaze at it during their leisure time. By making work the subject of the tourist gaze, work displays resulted in the museumization of work, marking the beginning of modern society as we know it today. In this sense, MacCannell's argument introduces the notion that mass-industrialization not only shifted cultural conceptions of work, but also gave rise to the mass-tourism industry.

Although work displays formed only a portion of the greater tourism market at the turn of the twentieth century, MacCannell argues that they "were central to the more fundamental transformation of industrial society into modern society."[76] Part of this transformation manifested in the struggle to reconcile the new, pervasive presence of industry in modern life. Work displays, particularly factory tours, provided an essential arena for grappling with these new identities and concepts. In their attempts to redefine work, leisure, and even industry itself, factory tours "permitted Industrial Man to reflect upon his own condition and to transcend it."[77] The self-reflexivity implied in this process, however, was only applied to upper middle class tourists, and not to the workers themselves.

The indulgence of this self-conscious contemplation was accessible only to those who had plenty of leisure time. Work displays were experiences designed to quench the curiosity of the privileged, who had likely never worked in a factory or at all. The middle class and even some of the working class engaged less frequently in work displays, but it did occur. MacCannell attributes these instances to a comparative curiosity and a desire to reconcile the role of work in their own lives by viewing it in others. This created a perpetual cycle of working in order to earn leisure time, which was in turn used to contemplate work through tourist work displays. In his book *The Tourist: Travel in twentieth-Century America*, geographer John Jakle described this phenomenon in late nineteenth-century America, where "recreation for the masses was seen as restoring the capacity for work. It was part of that endless cycle...wherein one labored to gain an opportunity to play and then played to labor more effectively."[78] This cycle was perhaps never more evident than in a work display, wherein tourists would visit factories during their free time to watch others work. Issues of socioeconomic class were thus deeply embedded into the design of work displays, physically manifesting in a number of ways that can be seen in a closer analysis of factory tours.

MacCannell has provided some pioneering theories for the field of tourism studies, but *The Tourist* emerges from a sociological perspective, rather than an architectural one. His terms and concepts related to work displays are well suited to my analysis of early twentieth-century factory tours, providing a clear framework for nuancing these examples as I move forward. Yet there is still work to be done. Few have conducted research as to how architecture may have shaped these tourist experiences, either constructing or reinforcing the narratives present in guidebooks, pamphlets and advertisements. Some scholars have already begun to untangle the complexities of architourism, making a compelling argument for incorporating architecture into these historic studies. This work continues in that vein.[79]

MacCannell's methodology utilizes Baedeker guidebooks as his primary medium for analysis, and these are indeed excellent sources. Moving beyond these textual accounts, however, may open up new evidence and analysis that illustrates the influential role of factory design in carving out spaces, and specific messages, for tourists. By looking at the spatial pathways, structural elements, and interior designs that both controlled and catered to tourists, an architectural study of these tourist practices could supplement MacCannell's analysis of the relationship between industry and modernity. Architecture played a major role in crafting a public 'image' of the factory, and therefore it is essential to view the spatial experience of these tours as well as their narrative elements.

Both the Shredded Wheat factory and the Larkin Administration building also included observation galleries, which allowed the tourist to literally 'look down' at the workers engaged in their tasks. Located above the factory production lines, these galleries created a privileged viewpoint that was not only practical but also highly instrumental in conveying meaning. The Palace of Light included observation galleries on both the second and third floors, which extended "entirely around the building, affording visitors an opportunity of inspecting the operation of all machinery without entering upon the floor of the factory and possibly interrupting the employees in their work."[80] Aside from minimizing worker interruptions, these raised galleries created a distinct tourist zone separated from laborer spaces and activities. Installed along the periphery of several rooms, multiple observation galleries at the Palace of Light were specifically designed to accommodate curious tourists who wanted to view the factory production line in process. Similarly, Larkin Company tours weaved through a number of workspaces in the complex, ranging from the soap production line to the more white-collar office spaces. There, tourists could gaze down at workers from the fifth floor 'Observation Point,' which provided a commanding view of the entire office hive.

Both the Larkin Administration Building and the Palace of Light were designed to not only accommodate tourists, but also literally elevate them above the status of the worker. Issues of class and gender are embedded within these structural elements, and therefore a closer look at both of these examples may reveal some of the ways in which these cultural hierarchies were architecturally communicated and reinforced. Even while sharing the same room, the viewing gallery and factory floor were vastly different spaces in terms of both function and occupant. By raising the observation platform above ground level, the architect constructed a clear message about the role of tourists and workers in this space. Unable to meet eye to eye at this height, tourists were instantly placed on a higher tier than workers, both literally and socially. As historian William Littman described, "Tourists frequently looked at employees from behind glass or down upon them from platforms and other raised viewing sites, intensifying the social distance between tourists and workers."[81] These galleries thereby created, or perhaps reinforced, an inherent hierarchal relationship that elevated the tourist to a higher socioeconomic status than those who were working. Even if some of the tourists were laborers themselves, they could exorcise their usual status by experiencing the observation galleries and gazing down at work during their leisure time.

Beyond merely providing the impression of corporate transparency, observation galleries suggested that tourists might try to gain some deeper understanding of industrial processes, or even the nature of work itself. The reality of these tours, however, only constructed a surface impression of the laboring condition in these factories. MacCannell suggested that factory tours enabled the tourist to "construct for himself the belief that he has gained some inside knowledge of the industry, but so long as he never meets the gaze of the worker, he need not carry away an impression of the worker's actual situation."[82] Design elements like observation galleries contributed to this division between actual work and the exhibition of work for tourists, which managed to construct a benevolent image of factory processes for the benefit of outsider's eyes.

By creating specific, highly controlled vantage points for tourists, architectural solutions worked in tandem with corporate executives and advertising aims to craft a careful display of industrial work. Tourists would watch factory operations from a predetermined position, which effectively hid the worker while displaying work itself. Viewing a large group of workers from above, rather than at ground level, tended to abstract the individual laborers into a collective body. In this way, the observation galleries presented an image of the 'big picture' rather than the nuanced details of factory labor, thus conveying the message of teamwork and a seamless system. This image of worker totality was also conveyed through an emphasis on machines, which were presented as alleviating laborers from mundane tasks or physical hardships. Seen from above, the messy realities of the factory floor appeared to be one well-oiled machine, working together towards an exalted industrial ideal. While MacCannell and others have devoted considerable attention to the sociological interactions of this tourist process, architectural elements such as the observation gallery have also undoubtedly contributed to these notions in a physical, spatial capacity.

Despite these commonalities, visitors encountered a more typical form of work display at the Palace of Light and the Larkin Company than they did at the Adams Powerhouse. Where scores of workers toiled below observation galleries at the former, visitors at the powerhouse gazed down onto an industrial workspace that was largely empty in comparison to those on more typical factory tours. Filled with machines rather than people, the powerhouse floor would have seemed remarkably different from the bustling factory floor at the Palace of Light located just a few blocks away. At the Palace of Light, the multitude of workers acted productively as a collective unit, signifying the seemingly benign environmental conditions of the factory floor and the company that ran it. At the Adams Powerhouse, however, there were only a handful of laborers working within eyesight of the observation gallery, and the physical aspects of this type of work would have also appeared to be far less demanding. As seen in Figure 11, only a single human worker appeared, typically engaged in the task of monitoring the switchboard, which appeared to be a far less taxing job on the body than working on an assembly line. Typically, skilled workers, or even engineers, would monitor the machines on the ground floor, directing the floor and distribution of the company's electricity output from their seat at the main switchboard. Tourists could observe these operations from above, where they would likely have noted, "the neat, easy manner of these workers [that] conveyed the clean, effortless, and leisurely aura of the electricity age."[83] This sense of 'effortlessness' of course, was only a surface-level observation, wherein the lack of hard physical labor would have made a distinct impression on tourists. Had they visited other factories such as the Palace of Light, they likely would have noted the clear differences between the appearance of 'work' at the new type of work display that the powerhouse provided from the observation gallery.

Machines, rather than people, appeared to do the majority of the work at the Adams Powerhouse, and in some ways that touristic impression was quite valid. The sparse presence of human workers on the main floor of the powerhouse may have seemed to usher in the machine age, wherein tourists could project their hopes for a cleaner, safer, and even more leisurely definition of work that some believed the future would bring. The lack of human workers at the powerhouse may have even seemed to suggest that there was very little actual work to see, leading some to the conclusion that perhaps someday, there would be more time for leisure overall. If, as MacCannell suggested, the work display was intended to 'permit Industrial Man to transcend his own conditions' than the particularly clean, orderly, and relatively worker-less appearance of the powerhouse would have provided hope for tourists that one day their own work could appear as minimally demanding as this one. Those that they could observe working at the powerhouse appeared to be in an advanced relationship with the machinery they operated, wherein they functioned as "extensions of the control room machines, dials and switches as heroes of the electricity age."[84] Seemingly operating as part of the machines themselves, these switchboard operators appeared, at least from above, to be working harmoniously alongside the equipment. Recording his impression of this relationship during his visit to the powerhouse, novelist H.G. Wells described "the dazzling clean switchboard, with its little handles and levers, is the seat of empire over more power than the strength of a million disciplined, unquestioning men."[85] In this view, it was the switchboard that proved to be the focus of the work display at the powerhouse, rather than the workers themselves. Unlike the depiction of power generators in Fritz Lang's *Metropolis*, these displays emphasized the benign and safe qualities of the machines inside the powerhouse. Rather than the bustling factory floor full of people, products, and motion seen at the Palace of Light, the view from the observation gallery at the Adams Powerhouse conveyed the opposite impression to tourists.

Much like the lack of humans in the work display, the overall appearance of the main room at the Adams Powerhouse was that of absence rather than presence. Presenting a clean, functional area where toil, dust and clutter had no place, a tidy appearance prevailed in the main control room of the powerhouse. Engineer Coleman Sellers remarked upon the absence of clutter in the room, stating, "a neat and orderly appearance prevailed, because conduits and casings kept the wiring carefully hidden." The lack of wires running through the main floor made a distinct impression on Sellers, as well as on journalist William Andrews. After visiting the Adams Powerhouse, Andrews identified the building's departure from other related structures. Describing the differences encountered at Niagara Falls, Andrews stated, "The typical power station of a decade ago was a chaos of electric wires which were festooned from the ceiling and crossed and recrossed each other in every direction. In the Niagara plant the wires are conspicuous by their absence, it being impossible to find a trace of this most important part of the installation."[86] In designing the powerhouse, engineers took care to hide the wires and cables from view. Tucked inside earthenware ducts in the cement floor, the cables were passed between the machines and the switchboard away from view in order to create a less cluttered appearance. Strand observed the impact of this clean, uncluttered appearance, stating "The production of hydroelectricity wasn't like the noisy, dirty factories of the Industrial Revolution, this was a sparkling industry for a gleaming new age."[87] Viewers such as Sellers and Andrews took note of this difference, marveling at the powerhouse, in this instance, precisely because there was not much to see.

Sound, or the absence thereof, also made a distinctive impression on tourists visiting the powerhouse in comparison with other industrial sites. Inside the powerhouse, visitors could observe not only the cleanliness and order of the main control room, but also the "relative quiet of the operation."[88] Silence, rather than noise, was a key element marking a break with the past, wherein other industrial factory tours were full of noise, chaos and motion. As Stilgoe has demonstrated, many American tourists were familiar with the interior of coal-driven powerhouses as a somewhat chaotic scene, "of pistons flying, balance wheels spinning, and drive shafts revolving."[89] This made it not only difficult, but also dangerous, to enter a powerhouse before the conversion to hydroelectricity utterly changed the appearance and operations of power stations in the late 1890s. Unlike the large steam powered boilers and machines, which Irwin described as "a clanging maze of moving belts and shafts," the Niagara dynamos "were remarkable for the simplicity of their streamlined forms of cold, black steel."[90] At the Adams Powerhouse, it was not movement but instead stillness, and silence, that distinguished the scene from others. As engineer Francis Greene observed on his tour, “To those who comprehend what tremendous forces are here controlled, this silent room is a most impressive spectacle.”[91] On a purely aesthetic level, this stillness and silence may have been less entertaining to the average tourist than the noise and motion that many had come to expect from other industrial tours. Sellers acknowledged the inherently boring qualities of this stillness to the average tourist, stating, “The electrical generators in the Power House will of themselves show perhaps little that is especially attractive, as to massive proportions or intricate and curious machinery, but they will be wonderful for their subtlety.”[92] Subtlety, stillness, and silence: these were the qualities of the second wave of the industrial revolution as it progressed beyond steam and coal power, and were immediately impressed on viewers who came to the Adams Powerhouse. While these qualities may not have been particularly compelling on their own, they would have been impressive when considered in context to other industrial sites and steam power stations. Comparison and context, rather than a stand-alone entertainment factor, thus formed the primary methods of impressing tourists at the powerhouse.

The comparative impact of this silence would have been particularly remarkable for tourists immediately upon entering the building, when the contrast in sound from the roar of nearby Niagara Falls outside would have been most evident. The constant din emitting from the waterfall even a mile away would have marked a distinctive break upon entering the building, where the thick limestone walls would have barricaded the sound outside. Inside, the relative silence of the building, in comparison to both other industrial buildings and to Niagara Falls itself, would have been immediate. Entering into a cavernous, voluminous space, visitors would have likely experienced a clear architectural divide between the interior and exterior sensory impressions of the space. Isolated from the classically inspired appearance of the naturalistic limestone exterior, the technologically sophisticated, silent, and even futuristic interior would have seemed remarkably different. Aside from the extremely large, long rows of windows around the perimeter of the building, the interior space would not have extended outwards towards the natural setting as it appeared to do from the exterior, but rather created an isolated chamber within the main control room.

In contrast, some of the tourist infrastructure installed at the Palace of Light created a more direct relationship with the roar of Niagara Falls outdoors than the Adams Powerhouse did. Perhaps the most prominent outdoor feature of the building was the rooftop observation deck, which served as a highlight of every tour to the Palace of Light. This rooftop site was an instant success, and was seen as "one of the most attractive features of the many to be found in the building. From this roof garden a most impressive view of the rapids is to be had, and it is sure to be eagerly sought by all visitors to the Falls, whether they are students of natural foods or lovers of the beautiful in nature."[93] The rooftop deck was usually the first stop on the factory tour, and the company thoroughly advertised this experience to potential tourists. The experience of this deck was described in *The Wonders of Niagara*, a corporate pamphlet, as follows: "while standing here and breathing in the pure, invigorating air from over the Upper Niagara Rapids one is impressed with the pains and foresight taken in the selection of this splendid location for such a model plant, far away from the dust and smoke of factories and with sunlight and pure air on every side."[94] The rooftop played an important role in conveying the natural setting of this industrial building, which distanced itself from the identity of other 'factories' by emphasizing its connection to light and fresh air.

The viewing platform, seen in Figure 12, included signage that oriented viewers in relation to both natural foods and natural wonders. The sign places Buffalo, the Rapids and Niagara Falls alongside the Wheat Storage Tanks and Shredded Wheat Park with equal importance, designating each of these disparate landmarks as significant sites for tourist eyes. The juxtaposition of industrial wonders with natural wonders in this sign exemplifies David Nye's notion of the technological sublime, which is encapsulated in this merging of hydroelectricity and the impressive cataracts at Niagara Falls. Tours at the Palace of Light reinforced this cultural notion by visiting the observation deck, which provided an architectural platform for visitors to gaze at both of these elements simultaneously. Merging the presence of industrial and natural wonders into a single sign, the rooftop observation deck was designed to situate the tourist within a large, dynamic system of tourist attractions at Niagara Falls.

Nearby, the Schoellkopf Power Station similarly incorporated an exterior observation space that emphasized the building's natural surroundings. Rather than a rooftop observation deck as at the Palace of Light, however, the Schoellkopf Power Station included an outdoor pathway for tourists to circumambulate around the perimeter of the building just above ground level. Seen in Figure 13, this walkway was built out from the power station in order to extend the view of the surrounding waterways and gorge. Executed in the same rusticated stonework as the bulk of the complex, this pathway would have seemed to emerge from the same naturalistic setting as the Niagara River and Gorge itself. This message was further conveyed by the addition of a few small landscape design elements into the outdoor pathway, which was adorned with small potted trees, vines, and other vegetation. The incorporation of this walkway proved to be a significant tourist attraction for those visiting the Schoellkopf Power Station, further linking the connection between the natural and industrial elements of the region. After touring the site in the early 1900s, Hubbard remarked that this outdoor observation pathway was the most memorable part of his experience. Describing both the views from the walkway and the design of the path itself, he stated, “The sight is wonderful ... Beautiful, compact, artistic structures occupy the space. Down below, thousands of trees have been planted. Vines, flowers, pathways, stairways and all that the genius of architects and engineers can supply in way of beauty, are here to be seen.”[95] Combining this architourist infrastructure with both manmade and naturalistic design elements, this observation pathway communicated the intricate relationship between the power station and its surrounding landscape. Much like the use of local limestone at the Adams Powerhouse, the materiality of the Schoellkopf Power Station and outdoor pathway suggested to onlookers that this power-generating endeavor situated itself within, rather than against, the natural wonders of Niagara Falls.

The Tour Path

This type of outdoor observation infrastructure provided architectural evidence of corporate aims to convey specific messages to visitors, but this meaning was developed and reinforced in tandem with a much larger, intangible program of narratives provided by tour guides. Despite the inherently temporary qualities of these observation experiences, some tour guide transcripts, correspondences and visitor souvenirs remain as archival evidence of these ethereal encounters today. Although their methods were less permanent than the physical tourist infrastructure of observation galleries, historic tour guide narratives provide great insight into the public perception of industrial spaces at the turn of the twentieth century. Historian William Littman came to similar conclusions in his research on factory tours, where he noted, "By offering each person the same choreographed sequence of experiences, companies believed they could elicit a predictable response of respect for the company."[96] Tour guide narratives confirm the highly controlled movements of factory tours, which more closely resembled a carefully crafted performance than a casual encounter.

While there are no known records of the tour transcripts that guides may have followed at the Adams Powerhouse, some evidence remains regarding the path that tourists typically followed when visiting the complex in Niagara Falls. In following tourists as they journeyed through this path, a number of architectural elements emerge that were designed or used specifically to accommodate and control the visitor experience in similar ways to the Larkin Company Administration Building. At the power station, visitors would enter two buildings in order to view the process of power generation and transmission, traveling through two distinct, interconnected structures on their guided tour. One promotional guidebook, designed to attract tourists to the site, described the path through the buildings as follows:

> Entering the office in Power House No. 2, visitors go up a broad staircase and get their tickets, then pass into a balcony overlooking the main floor, where the guide explains the machinery...An elevator takes the party down into the wheel-pit under the building, which is 177 feet deep, 461 feet long and 17 ½ feet wide, cut in the solid rock... From the wheel pit of Power House no. 2, visitors walk thru a passage under the canal to the wheel-pit of Power

> House No 1, and an elevator takes them up to the main floor...About half an hour is required to go thru the plant.[97]

This tour path indicates that visitors spent much of their time in motion, traveling through two different powerhouses in multiple directions. In the span of merely 30 minutes, visitors were led from an entrance lobby in Powerhouse Number Two up the stairs to receive their tickets, across the observation gallery to pause and view the machines from above, down into the wheel pit below ground and along an underground passage in order to complete their tour at the Adams Powerhouse (Number One). The description of this pathway also indicates the presence of multiple architectural elements designed to accommodate, circulate and guide tourists through these spaces. The observation 'balcony,' ticket office, wheel pit access and tunnel each hosted tourists during their journey, and these spaces served primarily to ensure that tourists experienced certain viewpoints from a safe and specific distance from the machines in operation. Movement along and between this infrastructure, therefore, was as essential to the tourist experience of these spaces as was the movement of laborers working in the powerhouse.

While the typical path of tours at the Schoellkopf Power Station and the Palace of Light led visitors through a series of both exterior and interior spaces, the Adams Powerhouse tours tended to stay mostly inside. Rather than moving from indoors to outdoors in the traditional sense, however, the tour path at the Adams Powerhouse traversed the boundaries between building and nature in different ways. Traveling first through the building above ground, and then descending into the wheel pit below ground, visitors at the Adams Powerhouse experienced a vertically oriented engagement with the process of hydroelectric power generation. The longitudinal section seen in Figure 14 demonstrates the extent to which the wheel pit stretched below ground, reaching to 177 feet below the powerhouse floor in some places. Evidenced in the section drawing, originally printed in *Cassier's Magazine*, this wheel pit housed far more than wheels, and stretched much further below ground level than the powerhouse did above ground. Excavated from solid rock, this wheel pit contained eleven turbines, which transmitted power to the turbines in the powerhouse above through a series of pipes. Adams described the process that tourists witnessed in more technical terms as follows:

> An elevator takes the party down into the wheel-pit under the building, which is 177 feet deep, 461 feet long and 17 ½ feet wide, cut in the solid rock. Here are installed 11 turbines revolving horizontally, driven by water from the river, which reaches the power house through a short canal, and then fills 11 penstocks or vertical pipes 7 ½ feet in diameter, which deliver it to the turbines. To each turbine is attached a hollow vertical shaft, 32 inches in diameter, which revolves with it and extends to the main floor above, where it drives one of the electric generators.[98]

As a fully operational system that required little manpower, engineers and workers would have rarely needed to spend much time in the wheel pit aside from the occasional maintenance of the shafts and machines located there. Most of the mechanics located below ground were also controlled by switchboards and levers on the main floor of the powerhouse, and therefore most of the access provided to this underground area was designed to accommodate tourists during the early twentieth century.

A marvel of construction, engineering and technology, this underground wheel pit was regularly included as part of the powerhouse tour beginning around 1900. Visitors were able to enter this area through "a passenger elevator located near the fifth and sixth large generators" on the powerhouse floor, which "gives access to the ten iron floors or platforms in the wheel pit."[99] Adams acknowledged, "The elevator in the wheel-pit was in frequent use, and the working turbines and their governors were always the subject of much interest and questioning."[100] The first stop on this descent was just one floor below the main level, which was termed the 'thrust bearing deck.' There, tourists would stand on a platform adjacent to the elevator in order to see "the driving mechanism of the governors, and some of the massive levers that operate the ring gates of the turbines, as well as the neatly arranged system of iron and brass pipe conductors for the water and oil supply."[101] While getting a look at this equipment up close would have been informative, taking the elevator to the lowest floor would likely have been a more thrilling experience. There, as one pamphlet described, "at this level one can see and appreciate the enormous depth of the underground works, the huge penstocks and the rotating shafts transmitting power to the turbines."[102] Although no direct tourist accounts of this experience have yet been found, these descriptions suggest that this underground portion of the tour was significantly different on a sensory level than that above ground.

The underground location of these machines, which was built out of and amongst the limestone that formed the walls of the powerhouse above, was deep enough to have also impacted the tourists physically, in the form of a lower temperature or even pressurized eardrums. The rotating shafts were likely in constant motion, in contrast to the relatively still turbines above. Furthermore, the sound of the rushing water below the shafts would have been much noisier than the silence that tourists experienced on the powerhouse main floor. The sensory impact of these noisy elements would have been further heightened by the relative darkness of the wheel pit area, which was illuminated with electric light to create a seemingly nocturnal effect. These changes in light, noise level, climate and motion would have likely created a distinctive contrast to the atmosphere tourists experienced above ground.

By 1901, material changes were made in the wheel pit in order to better accommodate tourists. Although the walls of the wheel pit were originally unlined when the building was first completed in 1895, by 1901, “The entire length of the pit has been lined with brick, and all the gangways and platforms constructed of iron and steel.”[103] Just in time for the thousands of tourists that would arrive in conjunction with the Pan-American Exposition, the company worked with engineers in order to amend the appearance of the wheel pit for outsiders. Constructing iron and steel viewing platforms at specific elevator stops on the tour, the Niagara Falls Power Company ensured that tourists would be safe, and feel safe, throughout the experience. Furthermore, while the pit was fully functional in bare limestone, lining the walls with brick reflected an attempt to reassure tourists that the underground portion of the tour was safe and stable. Prior to the brick-lined walls, “streams of water from underground springs jetted from the rock walls. These springs still exist, but their discharge is carried off by a drainage system behind the brick walls that form the lining.”[104] This physical amendment to the original conditions of the walls therefore did not change the function or operation of the wheel pit, but merely hid the presence of leaks from tourist view. While the building’s engineers did not view these leaks as a threat, the choice to line the walls with brick takes into account the presence of tourists and adjusted the appearance of the area as a result.

Similar infrastructural adjustments were made to accommodate tourists in the wheel pit in other ways, attempting to ensure that visitors would feel safe, comfortable and intrigued by this underground portion of the powerhouse. Rather than hide the presence of water behind the brick lining completely, for instance, the engineers incorporated a small door through which tourists could view the water used to power the turbines. As one booklet described, "On the lower deck may be seen through a small trap-door the torrent of water which pours from the turbines, which are quite hidden by the spray that glistens in the light of the electric lamps."[105] Adding a trap door enabled tourists to peer beyond the walls and floor of the lowest level of the wheel pit, and they could gain a sense of control over nature by choosing to view the water used to power the machines or to hide it behind the door. The installation of electric lighting, while also practical, further demystified the wheel pit for tourists, where "the pit is lighted throughout by electricity, and being kept dry and scrupulously clean, the interesting features of the work below the powerhouse floor may be seen to advantage and with comfort."[106] Much like the tourist infrastructure on the main floor of the powerhouse above ground, the material and structural adjustments conducted below ground ensured that tourists would leave the powerhouse with an overall impression of light, cleanliness and technological sophistication that harnessed Niagara for public benefit.

Over twenty miles away in Buffalo, the Larkin Company provided tours of their large campus that both horizontally and vertically traversed a combination of administrative and industrial buildings. While much of the tour focused on Frank Lloyd Wright's Administration Building, many of the stops on the tour also emphasized the inherently industrial origins of the Larkin Company and its many factory buildings. My archival research has uncovered detailed records surrounding the specific tour path, program and guide narratives that were used at the Larkin Company, providing further insight into the role that tourism could play in public relations. Evidence of the Larkin Company tours exists in the company's archives in the form of several carefully written scripts for tour guides to use when ushering visitors throughout the factory complex.

Although the Larkin Company gave tours in the early twentieth century, these archival holdings are strongest in materials from the 1920's. They provide a rare glimpse into the detailed evolution of the factory tour narrative, itinerary and design during this decade. A series of four transcripts dating from 1924-1927 illustrate the many transformations the Larkin tours underwent during these brief, but crucial, years. In 1925, the death of company founder John D. Larkin resulted in a series of changes made to the organizational, administrative and corporate structure that would affect the company until its dissolution in the 1940's. Among those many changes was the promotion of Crate Larkin to company treasurer and, eventually, president. Grandson to John D. Larkin, Crate Larkin swiftly moved into his new position, which among many other tasks, included the authority to update the company tour to suit its new vision in the next era of the company. These tour guide documents, present in several editions with numerous revisions, thus provide insight into the significant changes that occurred in the company both before and after the death of John D. Larkin.

Many scholars have addressed the significant impact of this new management structure on the company's history, including its effects on the eventual downfall of the company, its new products, and employee policies.[107] Yet few, if any, have closely examined the Larkin factory tour as a medium for negotiating these changes to corporate identity. Particularly with such detailed archival resources, the Larkin tour can serve as an excellent example of broader transformations that occurred in relation to the public image of the industrial corporation during this time. The changes made to these tour narratives, pathways and presentations during this time provide valuable insight into an era when both corporate identity and industrial realities were negotiated both within the company itself and in view of the public eye.

When examined as a cohesive unit, this series of tour guide transcripts reveals a distinctive evolution in corporate strategies and identities over just a few years. Overall, these tour transformations reflect a general push towards controlling the public experience of industry with increasing efforts over time: put simplistically, there was a shift from emphasizing the company's product, to its architecture, and then to its corporate image overall. Marchand's research on corporate displays at world's fairs noted a similar pattern in industrial exhibits, which first brought their products, then miniaturized factories, and then their photographic or filmic representations to the fair. This pattern is remarkably similar to my own findings at the Larkin Company. Marchand, however, traces this evolution over the first three decades of the twentieth century, but the Larkin tour transcripts exhibit these transformations over just three years. In this sense, it can serve as a condensed, microcosmic vision of the broader industrial transformations occurring in the public eye from roughly 1900-1930. By examining this through a different medium- tour guide narratives rather than world's fair displays- this analysis reinforces and complicates Marchand's thorough discussion of this general pattern of industrial corporations' promotional tactics.

The Larkin Company's tour guide transcripts reveal a number of different transformations over time. Edits include alterations to the tour's path, narrative and delivery methods. The tour itinerary featured similar locations during these years, with the Larkin store, administration lobby, coffee-roasting room, macaroni room and perfume laboratory all appearing consistently throughout the course of the company's history.

Despite these similarities, the transcripts also indicate some variations in the ordering of locations, as well as a few additions and subtractions to the itinerary over time. These edits, which became increasingly numerous and detailed as time passed, indicated that the Larkin tour was an organic, active agent for public engagement. Far from being a static, isolated component of corporate promotion, the tour's constant transformations suggest its role as a medium for negotiating the ongoing evolution of corporate identity. Furthermore, the frequent narrative changes made to the tour guide script indicate the continual attempt to aid the public in navigating the increasing presence of industry in daily life.

Tracing the edits made to the physical pathway of the tour is also an excellent way of connecting corporate promotional goals to industrial architecture. Changes to the movement through these spaces, the presentation of them by the guide's narrative, and even the specific position of the guide in relation to the room while speaking exemplifies the factory tour's relationship to architecture. Although the factory's design is relatively fixed in place once it is built, tours allowed the company's management staff to create a more malleable interpretation of industrial spaces. Through content, narrative style, and spatial sequencing, the tour served as a medium that could re-present the factory to the public in order to best suit corporate needs. By controlling the angles and interpretations through which visitors encountered the factory, tours provided an inexpensive way for companies to make small adjustments to the public perception of industrial spaces without actually changing their physical qualities.

The edits made to the tour from 1924-1927 suggest a constant revision of spatial practices in order to best present the factory to tourists. Many of these revisions were made by Crate Larkin, in conjunction with Jewett. A letter from Larkin to Jewett suggests the method of making these changes was something akin to participant observation, where Larkin suggested, "you and I had better go on the trip together, noting the points of interest, after which the spiel can be written."[108] Rather than organizing the tours remotely, this suggests that Larkin and Jewett experienced the same tour that the average tourist did. The careful consideration and effort put into these tour edits indicates the prominent role of this tour as a medium for public engagement with the corporation and factory itself.

Larkin Company tours were carefully constructed to promote or subdue particular corporate agendas at any given time during this period. While many locations on the Larkin tour stayed the same, they were often reconfigured to appear in a different sequence. Buildings that appeared on the 1924 tour were often absent on the tour three years later, and others were added to the itinerary to promote new agendas. Even the different starting location of the tour between these two years suggests a reworking of the itinerary, in order to better suit the shifting needs of the company in crafting its public image under new management. While the tour's starting point in 1924 was Store A, the 1927 tour began in the Council House. This change moved the tour's first focal point from what would today translate as the gift shop to the women's building.

This subtle but effective shift to the Council House echoes a broader transformation that occurred in Larkin marketing tactics during this decade. The Council House provided leisure space and recreational programming for the women employees at the Larkin Company, thereby addressing the greater public urgency to protect and educate young female workers in the industrial system through welfare work, as previously discussed in this chapter. Although the Council House was not included on the tour itinerary until 1925, by 1927 the tour both began and ended in the Council House, making it a primary feature of the trip. This change, in conjunction with many others, suggests an important transition in the strategic approach to describing the company to outside visitors. Earlier tours tended to emphasize Larkin products rather than its public service. Tours in 1924 not only began in the gift shop with a bounty of items, but also followed the general path of manufacturing a few items from start to finish, creating an assembly line experience of the products for tourists. By 1927, the tour's itinerary and narrative demonstrated a significantly different approach. Rather than featuring Larkin products as the primary attraction, the later tours emphasized corporate identity. By the late 1920's this corporate identity was thoroughly intertwined with the company's benevolent treatment of employees.

The later inclusion of the Council House indicates the company's attempts to craft an image of itself as having a particular concern for its female employees. The 1927 tour guide transcript made sure to tell visitors that in the Council House, "Women employees may spend a pleasant noon-hour resting or reading on these comfortable sofas produced in our own furniture plant."[109] Situating the entry point to the Larkin tour at the Council House created a specific frame through which to view the rest of the factory's operations, emphasizing the company's benevolent treatment of women as a primary aspect of its corporate identity. Welfare work programs were mentioned throughout the narrative content of the tour, but positioning the tour's start and end at the Council House suggests a desire to connect and impress female tourist-consumers in particular.

The choice to feature the Council House on the tour indicates the new Larkin executives' awareness of their typical customer clientele: women. Although the tourists visiting the factory complex comprised only a fraction of the company's overall customer base, Larkin executives nonetheless strategically tailored the tour to better suit the interests of their dominant consumer profile. Larkin scholars have identified the company's target audience as middle class and working class women, looking to purchase goods for the home at a lower cost. An illustration in a company pamphlet, *The Home of the Larkin Idea*, depicts a typical tour group in the early twentieth century (Figure 15). Notably promoting the 'Larkin Idea' rather than simply its products, this pamphlet provides a narrative tour through the complex's many production spaces and administrative areas for customers living outside the Buffalo region. Led by a male tour guide, four women and one man, for good measure, tour the complex in modest clothing, donning Gibson Girl attire and white shirtwaist dresses, the uniform of working women. Humble but dignified, they pay careful attention to the guide's directions, experiencing the new sights amongst the comfortable environment of other similar women and a professional escort. Company records suggest that tours were provided for free, every hour on the hour, typically with up to twenty-five tourists in a group. By the 1920's, five regular guides were employed to give tours at any given moment, but they also held other positions within the company as well.

Another company pamphlet provides a verbal narrative tour through the Larkin complex, for armchair customers who could not visit the factory in person. A selection from *Your Trip Thru the Larkin Factories* describes a more diverse mixture of gender and classes on these tours, stating:

> The little army of 65,000 people who visit us each year: these visitors include all grades of society. A party of distinguished foreigners may be succeeded by the members of a prominent Woman's guild; social economists mingle with day excursionists; eminent lecturers walk side by side with the enthusiastic housewife; classes of school children from the city schools with their teachers; young and aged men, the mother with her family, and the young bride-all are received here with courteous attention.[110]

While there is some truth in this mixture of tour visitors, the tour guide transcript and related correspondences suggest a particular aim to communicate the Larkin identity to women first and foremost. Various types of women are mentioned in this description, ranging from housewives to guild members, schoolteachers to fiancées. The pamphlet paints a picture of these tours that includes both genders and many economic classes, but in doing so it aims to attract female customers more so than men. The notion of an "eminent lecturer walk[ing] side by side with an enthusiastic housewife," may have been a more exciting prospect for the enthusiastic housewife than this distinguished male lecturer. Furthermore, this imaginary housewife might also be particularly eager to experience this diversity of strangers outside the home. Therefore, while tourists to the factory complex were likely a diverse group in reality, this pamphlet may exaggerate this diversity in order to attract its largest body of consumers- working-class women looking to experience new sights and social settings while on vacation.

Other edits to the tour transcript during this time suggest an increased emphasis on entertaining tourists, rather than solely educating them about the company's industrial processes. One of the most curious changes made to the tour itinerary was the elimination of the Big Kettle rooms from the script in 1925. The Big Kettle rooms, along with the other soap production rooms on the fourth floor of Building G, were removed from the itinerary shortly after the new Larkin executives took over for the previous administration that operated under John D. Larkin. The 1925 transcript shows the soap portion of the tour is marked simply as 'Out' with a line through it. Particularly for a company known primarily for its soap products, the elimination of all of the soap rooms from the tour after 194 is a curious example of this transition of management. Crate Larkin edited this transcript in order to take the company in a new direction. Although soap products were central to the company's development, tour transcripts made a determined shift away from their production processes, perhaps due to the relatively dull details involved in recounting their highly technical, laborious creation.

In comparison to food products, soap was hardly exciting, and more importantly, difficult to consume on site. Relegating the educational nature of soap production to corporate pamphlets and booklets, the Larkin factory tour in the mid-1920's focused instead on food products. Although today the Larkin legacy has remained firmly attached primarily to soap, the company catalogue was much more diversified than today's memory would suggest. When the tour shifted its emphasis to food, soap was promoted mainly as the company's initial ticket to success, as part of its origin story rather than its sole identity. The 1925 tour introduction reframed this narrative, stating "Originally we manufactured only soaps, while today, beside a wide variety of Laundry and Toilet Soaps, we produce on a large scale, Pure Foods, Toilet Preparations, Furniture, Wearing Apparel and Paints."[111] Equally emphasized in this introduction is the company's development of the Factory-to-Family program, identifying themselves as the "originator" of this idea. This claim was presented alongside an assurance that this idea has benefitted the customer with massive savings, allowing them to purchase "a double amount of Larkin Products for the same price."[112] Aligning soap with its origin story, as the original medium for developing the company's signature business practices, allowed tours to focus instead on the more tactile, sensory aspects of visiting the factories in person.

Food products, as well as the perfume laboratory and spice filling rooms, amplified the sights, sounds and smells of industry in a way that soap could not. Marion Harland, a predecessor of Martha Stewart, marveled at the exotic materials abundant throughout the plant. In *My Trip Thru the Larkin Factories,* a lengthy, semi-promotional booklet produced for the company, she describes encountering Mexican vanilla beans, South American coffee, Italian semolina, Indian varnishes, southern peanuts, and perfume solvents from France, China, the Philippines and Bulgaria. Harland writes of the strong aroma of coffee, the nutty taste of a peanut butter sample, and the delicate, valuable qualities of the extensive perfume laboratory. Although the ethereal experience of these smells and tastes has vanished today, this surely must have appealed to the senses for visitors to the Larkin factories in the early twentieth century.

These tour guide transcripts reveal not only edits to the itinerary of locations, but to the narrative content as well. There is a noticeable shift in the transcript text during just these three years, suggesting the new executives' determined efforts to continually reframe the Larkin factories in the public eye. While the product lines did not dramatically change, tour guide narratives began to shift away from emphasizing soap to emphasizing a broader diversity of products. Earlier transcripts provided more general guidelines for guides to use while presenting a brief history of the company's origins alongside a relatively direct explanation of factory operations. In a factory tour trend that journalist and historian Carolyn Kitch has suggested continues today, numbers and other facts emphasized the sheer scale of the factory operations during the earlier tours. Examples of this abounded on the Larkin tours, which included, “This building is 580 feet long and 10 stories high,” and “we produce 25,000 bottles of perfume a day,” and “over 100 people can talk on this phone at the same time.”[113] Kitch has noted “these many facts and figures are delivered in a way that blends information with entertainment and that has the gee whiz quality of a trivia game.”[114] Although this inclusion of numbers continues in the later factory tours as well, the earlier transcripts rely much more heavily on this tactic in order to communicate the sheer scale of operations.

Particularly after 1925, however, a series of edits to the transcript shifted the tour narrative emphasis towards the company’s exemplary welfare work and civic service, attempting to infuse a sense of humanity into their large scale operations. Architecture became a primary medium for communicating these corporate efforts, particularly given the Larkin Company’s general resistance to unionization. In order to dissuade workers from unionizing, the company emphasized its beneficial work environment to both employees and customers. The narrative often directly linked the factory’s physical conditions to the company’s upstanding employee policies. While earlier tours had included a brief history of the factory’s original buildings, later tours increasingly directed visitor attention towards specific aspects of the factory complex. When passing through the Administration building, tour guides stated,

> Notice the immense glass skylight above the court and the plate glass windows on all sides, which afford us an abundance of daylight, making the electric light hardly ever necessary. When we do use the electric light, you may note that a non-glare globe is employed. Every precaution is taken to protect the eyes of the workers.[115]

This suggests a significant effort to use architecture as a way of promoting the company's less tangible attributes. Using the example of lighting, guides directed tourists' attention to a physical aspect of the building while also verbally communicating the company's benevolence to employees at the same time. By not only noting that "every precaution is taken to protect the eyes of workers," but also pointing directly to the glass windows and non-glare globe, tour guide transcripts utilized architecture as a manifestation of company values. This tactic directly linked visual cues to verbal narratives, wherein tourists could then, at least theoretically, mentally connect this physical object to the verbal content provided by the guide.

Examples of this tour technique abound in the transcripts after 1925, which often link the guide's insistence on corporate welfare work to architectural aspects ranging from light bulbs to pillars, skylights to furniture. By 1927, the transcript had undergone a number of revisions that made it significantly different from that of two years ago, the most notable being the infusion of welfare work into the narrative. Although the Larkin Company had initiated several of the featured welfare programs several decades earlier, their presence in the transcript narrative became increasingly prominent during the late 1920's. This is likely due to a number of factors. The change in management staff was certainly an influence on nearly all aspects of the company's operations, including the tours. Additionally, this was a period of time when the American public became increasingly concerned about the rapid growth of large corporations, which often went unchecked. Particularly in the wake of labor reform debates, many corporations increased their efforts to install, or at least promote, their benevolence to employees through welfare programs.

Evidence of this context emerges not only in the content of the Larkin tours, but also in their promotional publications as well. In *Your Trip Thru the Larkin*, which provided a virtual tour through the complex by way of a booklet, the narrator envisioned the response of the ideal tourist, conveniently named 'Mrs. Bright,' to the Larkin factory conditions:

> Mrs. Bright said that the evident contentment of the workers, and the strictly hygienic conditions, are in striking contrast to the sweat-shop atmosphere too often associated with the manufacture of articles of feminine wear. She also said: 'After seeing these dainty articles made at such reasonable prices, it seems foolish for any woman to make them by hand.... Larkin economies in the cost of manufacture are not attained by so called 'cheap labor.' All things considered, Larkin employees are paid higher than the prevailing rate of wages with shorter hours.[116]

This clever, if transparent, imaginary narrative reveals more about the company's public agenda than about its actual practices. This narrative both acknowledges the 'sweatshop atmosphere' that many worried about at the time and then directly subverts those expectations. Particularly aimed at all of the women who could identify with the exemplary Mrs. Bright, this narrative assured the company's female customers that a purchase from the Larkin factories was not only guilt-free, but also an action of social good. By buying Larkin products, female consumers could support the 'proper' treatment of female laborers who, as this pamphlet and factory tour both assured, were working in excellent conditions.

The desire to construct and control the public vision of the company is also evident in the transcript margins, which were filled with increasingly specific directions and edits for the guides in the late 1920s. The Larkin Company tour experience became more constricted during this decade, as edits were made to regulate not only the guide's presentation but also the movement of tourist bodies as well. Directions to the guides become more detailed during this time, providing specific placements for their presentation. While earlier transcripts simply provided text for guides to deliver in certain rooms, later editions included directions such as “stand in front of master clock” and “speak from the south end, facing the court.” The insertion of these directions exerts a subtle but powerful control over not only the tour guides’ movements, but correspondingly the positions of the tourists as well. Naturally placed in response to the guides as a captive audience, the position of the guide was directly related to the placement of visitor bodies. By controlling the angles and movements of guides throughout these spaces, transcripts also inadvertently controlled exactly what tourists would see in an increasingly specific line of vision. In this sense, these transcripts provide some excellent insight into not only the narrative content of these tours, but also their precise choreography through these spaces in ways that created an intricate, tangible relationship between architecture and corporate image.

Instructing the Tourist

Due to the nature of these different industries, the intellectual content of the Adams Powerhouse tour was far more difficult for many visitors to decipher than on the Larkin Company tour. In many ways, it was not an easy task for tour guides at the Adams Powerhouse to explain the complex processes behind the way hydroelectric power was generated and transmitted. Even at a basic level, it was likely difficult for many people to understand how electricity truly functioned, particularly at a time when it was still a new concept to the average American citizen. As Irwin has suggested, “The general public stood little chance of understanding the conversion of power from the plunge of Niagara's waters into transmittable energy."[117] While this was likely true, it is clear that this did not deter tourists from coming to the powerhouse. Adams aims to 'instruct' tourists at the powerhouse may have been only marginally successful in some cases, but that did not seem to matter as much to visitors as it did to him. Even if they did not fully understand it, the powerhouse remained a Niagara Falls attraction to the general public, Coleman Sellers insisted, because "they cannot help but be impressed with the magnitude of the undertaking and the thought of this great power being turned to the uses of man."[118] While the average tourist may not have walked away with a complete understanding of the sophisticated scientific forces at work, they certainly would have gleaned some knowledge about some small aspect of electricity that they could now directly relate to a physical location and process. Acknowledging the difficulties of explaining the complex mechanics behind hydroelectric power generation and transmission in a half-hour long tour, the question becomes, how much did the average tourist actually learn at the powerhouse? Furthermore, to what extent did it matter? If tourists kept arriving at the powerhouse for several decades, perhaps Adams' two other hopes for the building- that it would attract and protect, rather than solely instruct- were successful enough that the educational qualities of the tour could be deemphasized.

Although tourist-written records of their experience at the powerhouse are virtually absent from most archives, other forms of documentation suggest that officials categorized tourists into two main types. On the one hand, the powerhouse was known to attract experts in electricity-related fields, with engineers, mechanics, and other specialists attending powerhouse tours in great numbers. Referencing visitor guestbooks from 1914, Adams listed tourist signatures from 31 countries, including five princes and dozens of engineers. He stated, "As a class, engineers were the most numerous. They came from all countries, particularly our own, and usually appeared well informed in a general way of the company's problems and how they were being solved."[119] In addition to professional engineers, students of engineering came to the powerhouse on field trips from multiple colleges as well. It is important to note that most of these highly educated, specially trained, or professionally-oriented tourists were typically male, due to the notion that women were usually restricted access towards these professional venues in the early twentieth century, which were almost entirely dominated by men at the time. This reveals a significantly different type of tourist at the Adams Powerhouse than at the Larkin Company, wherein male specialists composed a substantial portion of the audience rather than the predominantly female target audience on the Larkin Company tours.

These 'engineer-tourists' tended to take an active interest in the content of the tour. In an article where he reflected on the experience of being a tour guide at the powerhouse for a decade, engineer Paul Lincoln provided insight into the typical activities, questions and demographic background of many of the tourists he encountered. Initially hired in 1896 as an expert in engineering intended to "look after the company's electrical installations which began to supply current commercially a little later in that year,"[120] Lincoln soon found himself doubling as a tour guide for visitors who arrived at the building. Although he never directly stated his opinion on the nature of that task, his impressions prove valuable today as a glimpse into the typical tourist experience at the Adams Powerhouse during the early twentieth century.

During his time there, Lincoln stated, "distinguished men from all walks of life and of all nations were continually going and coming. Not a small part of [Lincoln's own] interest was the opportunity thus afforded of meeting and talking to well known men who visited the plant."[121] Some of the most distinguished visitors included international dignitaries, expert inventors, and American politicians. U.S. President William McKinley, for instance, visited the powerhouse "just an hour or two before he was shot... On leaving the powerhouse he went directly to the Pan-American Exposition at Buffalo where he was shot. His last signature was written in the visitors register which has always been kept at the power house."[122] Lincoln also recalled several playful anecdotes involving other dignified tourists, as in the case of Li Huang Chang, a Chinese statesman who was carried around the powerhouse by four Chinese bearers while he was seated in his sedan chair. Out of curiosity, he stuck his cane into one of the generators as he was being carried through a narrow passageway in his chair, and the cane was destroyed by the machine.[123] During Nikola Tesla's tour of the powerhouse in 1897, "his eye caught a small motor used in starting a rotary converter. He asked what it was, and I told him it was a Tesla motor. He said 'surely it is a wise father that knows his own child.'"[124] In contrast, when Thomas Edison visited the Adams Powerhouse in 1901, "he remarked that he 'didn't know very much about alternating current,' and then proceeded to ask a string of questions so worded as to make it quite impossible to believe his statement."[125]

Aside from these expert engineers, inventors and politicians, Lincoln also discussed the habits of another type of tourist that visited the powerhouse: a more general, 'non-expert' type of tourist. This kind of tourist would have little to no prior understanding of electrical operations, and would typically enter the powerhouse as part of a more casual visit to many of the attractions in Niagara Falls region. As a broader, more diverse group of tourists, the 'casual tourist' type would have also included some women visitors as well. Lincoln discussed the curious nature of this type of 'casual tourist' who came to the powerhouse, observing that they were drawn to the Niagara area, "by the double magnet of the world's greatest artificial wonder situated alongside the worlds greatest natural wonder."[126] In contrast to the engineer tourists, the casual tourists had little prior knowledge of how electricity functioned, and therefore came to the powerhouse because they "wished to understand the process, know what became of the water diverted, and how it would be possible to translate the water-power into an electric power that would escape to Buffalo unseen."[127] This 'unseen' quality proved to be one of the most difficult aspects to communicate to viewers, who may have expected to be able to see the full mechanics of the powerhouse in operation. As the tour program developed, guides had to directly acknowledge that this powerhouse was "very different from previous efforts to harness this type of mighty power." In contrast to other early tourist encounters with water power, such as the giant waterwheel on display at the Centennial Exhibition in Philadelphia in 1876, at the powerhouse "the monster water-wheels were buried far out of sight in the native rocks...yet the public wanted to see the wheels go 'round.'"[128] The underground portion of the tour was likely added in response to this sentiment at the turn of the twentieth century, as it offered a closer look at the 'unseen' mechanics of powerhouse operations.

Even this would have been relatively indecipherable to many tourists who were not already experts in the field, although it would have provided a visual cue that could begin to relate to the complex processes that guides like Lincoln attempted to describe. Acknowledging the difficult nature of this educational material for the casual tourist, Adams seemed unconcerned that visitors leave the powerhouse with a full understanding of the electrical process. Instead, he hoped, "Each visitor should learn enough to desire to know more, and should be impressed that the managers of the enterprise had confidence in the investment of their own capital, and had built for endurance and continuity of operation."[129] Increasing their curiosity, rather than quenching the thirst for knowledge, appeared to have been the goal of the Niagara Falls Power Company entrepreneurs in 'instructing' the visitors on a tour through the powerhouse. Adams did not expect casual tourists would leave the powerhouse with a complete understanding of electricity, but he certainly hoped that they would understand it just enough to be impressed by the corporate enterprise that funded the endeavor.

While publicity pamphlets encouraged visitors that the powerhouse was "rich in features of interest to the visitor, whether engineer or layman,"[130] Lincoln was not always amused by the questions and behaviors that he witnessed from the general tourist population at the powerhouse. Observing the differences between engineer tourists and those that came from a more general background, Lincoln reflected, "Niagara is, and always has been, a mecca for the tourist. Not all of them are of the same stripe as indicated by the foregoing incidents."[131] Discussing these more casual tourists in a sometimes harsh, mocking tone, Lincoln stated, "The ludicrous questions that were asked by the visitors would fill volumes."[132] Providing examples of these questions to his audience of readers, who were mostly experts in the field, Lincoln described:

> One man wanted to know what make of pump was used to pump the water from the wheel pit. Another was surprised to see the water going into the penstocks leading to the turbines, instead of coming out. The both probably had some vague idea that we had to pump out the water after it had passed through the turbines. 'Oh, then you don't use the Falls; you just use the river as a source of water supply;' and 'Why cant we have a similar development at Detroit? We have as great a water supply as you have here.' These are samples of the remarks that were continually being made.[133]

While many of these tourists were clearly mistaken in their initial impressions of the process, Lincoln's description of these false conceptions was clearly aimed at his audience of expert engineers, rather than the average citizen. As the article was published in *Electrical Age*, Lincoln's anecdotes were mostly intended to reach a group of readers that he assumed would understand the obvious mistakes made by the tourists in this line of questioning. While this particular passage relied on more obscure tourist errors, Lincoln also provided more obvious examples of tourist mistakes. Discussing the underground portion of the tour, he stated, "On several occasions I have opened the trap door over a running wheel to show the chaos of water as it leaves the turbines, and have had to restrain members of the party from starting down the ladder into it. They evidently thought it was the next place to go and were not to be daunted by a little water."[134] Lincoln includes a seemingly exhaustive list of anecdotes like this one, including an instance where a women mistakenly identified a coat of red paint for heat derived from the generators, and a man who "asked where the kilowatts were kept, and if he could have one to take away as a souvenir."[135] Lincoln's unforgiving tone brings readers into his side of the tour as a guide, and through these impressions it is possible to glean some insight into what MacCannell would deem the 'back room' of this tourist experience at the powerhouse.

Aside from providing colorful impressions of casual tourists, Lincoln's discussion valuably reveals some of the misconceptions tourists typically had when they first arrived at the powerhouse. Confusion about the mechanics of waterwheels and the wheel pit seemed particularly common amongst many visitors upon entering the powerhouse. As Lincoln described, "Another man's question would be, 'Where is your big wheel?' I have often felt that I would like to put myself into that man's place and see for myself the picture that he had made for himself of our plant. Probably he expected to see a wheel set up against the falls themselves, and perhaps connected to machinery by belt, or chain or gear."[136] Related to this, many visitors were concerned about the diversion of water from Niagara Falls, and curious about the exact process. Perhaps having encountered some of the Free Niagara debates in local and national press, visitors often questioned the guides on the specific amount of water, where the water came from, and if it was ever returned. In response, Lincoln wrote, "Usually it was easy to convince these doubters that the falls were a necessary part of our development scheme, and that the idea of pumping the water out of the wheel pit was equivalent to trying to lift one's self by one's own bootstraps."[137] These efforts to 'convince,' rather than merely instruct, the visitor were at the core of the tourist infrastructure that the Niagara Falls Power Company employed through the architecture of the powerhouse. Returning to Adams' assertion that the purpose of this tour program was to spark curiosity and create admiration for the entrepreneurs that initiated the company, Lincoln's remarks confirm the multiple, overlapping motivations for accommodating outside visitors at the powerhouse. Architectural tourism, in this case, served an essential function in gaining public admiration and trust at a time when this business venture was still highly speculative and technologically innovative.

Although this type of casual tourist may not have gained a full understanding of the hydroelectric power generation process by the time they left the powerhouse, the tour likely infused the visitor with a heightened visual awareness of electrical infrastructure henceforth. Acknowledging that the information provided by tour guides at the powerhouse was only minimally decipherable, one visitor remarked, "These complex figures do not mean much to most people."[138] Having taken the tour as an introduction to the topic, however, the same visitor suggested that afterwards, "One receives a better idea of the capacity of the Niagara Power Company as they travel through the country surrounding Niagara Falls, and see the many high-tension transmission lines which are run by Niagara power."[139] Embodying the "most ethereal and magical aspect of the Niagara electrical system,"[140] the power lines that ran from Niagara Falls to Buffalo served as a physical touchstone for the lessons that visitors attempted to decipher at the Adams Powerhouse during their tour. After leaving the powerhouse, visitors may have noticed this electrical infrastructure in new ways, where "Arching power lines draped on tall poles stood as the only tangible evidence of the enormous power potential on its way, moving invisibly at a lightning fast pace."[141] As the physical representation of what seemed to be the least tangible stage of the process, the transmission of electric power from one place to another, power lines became increasingly captivating in the public eye at this time.

While today power lines crisscross the world so commonly that many have learned to crop them out of photographs, some images featuring power lines as the main subject have emerged in early-twentieth-century photographs. Expressing both an aesthetic and conceptual appreciation of this infrastructure, Figure 16 exemplifies this type of imagery, which emerged alongside the introduction of large-scale hydroelectric power at the Adams Powerhouse. Found within an album of photographs composed and commissioned by the Schoellkopf Power Company, the image presents a compositional emphasis on the presence of the power lines. Dated June 12, 1924, the photograph exhibits several aesthetic cues that indicate the prominent force of electric infrastructure in an otherwise naturalistic landscape. The power lines and pylons occupy a prominent position in the image's composition, surrounded by an otherwise predominantly natural context characterized by a stream and multiple trees. Although the image depicts these power lines in a relatively pastoral setting, the main subject matter of the photograph is undeniably the power lines themselves. In a manner akin to Alfred Stieglitz's iconic *The Hand of Man* (1903) photograph, this image compositionally emphasizes the appearance of this industrial infrastructure rather than deemphasizing its presence in nature.

Embracing an aesthetic that resonates with David Nye's concept of the technological sublime, or perhaps a more pastoral version akin to Leo Marx's 'machine in the garden,' photographs like Figure 16 also demonstrate the impact of this new electrical infrastructure on both the landscape and on the general public. Although some citizens may not have fully understood how the power generation and transmission process actually worked, the increased presence of electrical power lines served as a tangible reminder of their impact on daily life. Much like the sleek, silent turbines at the

Adams Powerhouse, this infrastructure did not have to be fully comprehended to be appreciated by the casual viewer. While today power lines may seem mundane or even invisible to the average citizen, photographs like these express the developing aesthetic of the technological sublime and provide insight into the sociocultural impact of electricity in the early twentieth century.

As visitors traveled to and from the Adams Powerhouse, they followed the pathway of power lines that directly connected Niagara Falls to Buffalo. Serving as tangible evidence of the otherwise largely mysterious, ethereal process of electric power transmission, these power lines also directly united these two cities into a larger geographical, economic and industrial region in clear ways. Emerging in this regional landscape during the years surrounding the turn of the twentieth century, these power lines provided a particularly prominent link between these cities during the Pan-American Exposition in 1901. Approximately seven million tourists, or roughly 40,000 a day, visited the Buffalo-Niagara region to attend this world's fair, which featured electricity as its primary theme. When the City of Buffalo re-branded itself as the 'City of Light' at the Pan-American Exposition, Niagara Falls played a prominent role as the power source for the fair's many electric displays, exhibits and nightly illuminations. Furthermore, many visitors extended their trip to Buffalo into Niagara Falls, where they could tour the primary source of the fair's power at the Adams Powerhouse. In doing so, visitors engaged in a regional tour economy that was largely oriented around electrical developments at this time. By comparing the tourist infrastructure at the Adams Powerhouse with that at the Pan-American Exposition, the following discussion takes a closer look at the interconnected, overlapping ways that the public engaged with the marvels of electricity as it emerged in the Buffalo-Niagara region at the turn of the twentieth century. Combining educational tactics with entertaining spectacles, the architecture and exhibits at the Pan-American Exposition provided curious tourists with an alternative introduction to electricity that worked both individually and in tandem with the tourist methods utilized at the Adams Powerhouse.

Part 2: At the Fairs, 1893-1901

While interested experts and curious citizens made their way to the powerhouse, a larger and far more general audience encountered Niagara's electricity through the lens of the Pan-American Exposition of 1901. Although the fairgrounds were located in Buffalo along Amherst Street, the iconography and electricity of Niagara Falls played a central role in the Pan-American Exposition. During this time, as art historian Helene Valance has observed, "electricity became synonymous with Buffalo's ambitions."[142] Celebrating the artistic, architectural, cultural, technological and industrial achievements of the Buffalo-Niagara region as a whole, the Pan-American Exposition attracted seven million tourists from May through October, 1901. Aside from the marvels provided by the fair itself, visitors and armchair travelers alike turned their attention to the region when the President of the United States, William McKinley, was shot by anarchist Leon Czolgosz at the Temple of Music at the fair on September 6, 1901. President McKinley died eight days later at the home of Exposition President John Milburn, and Theodore Roosevelt was subsequently inaugurated as the Twenty-Sixth President of the United States in Buffalo on Delaware Avenue. During this time, the Pan-American Exposition continued to attract tourists to the fairgrounds, to Buffalo and to nearby Niagara Falls, who were drawn to the region while it served as the epicenter of these transformative political events on a national and international scale.

Despite its geographical distance from the fairgrounds, Niagara Falls played a large role in the imagery, architecture, exhibits, and functional operations of the Pan-American Exposition. Electricity generated at the Adams Powerhouse in Niagara Falls was transmitted to the Buffalo in order to power the fairgrounds, and this marked an important moment in the history of long-distance hydroelectric transmission that the fair itself was designed to celebrate in multiple ways. Architectural illuminations, electric exhibits, and water features were aggressively promoted and well attended at the Pan-American Exposition, reinforcing the central theme of the fair through a diversity of design elements and exhibitions. Even the most popular promotional poster for the fair, which has since been called "the most effective advertising poster of all time," capitalized on the interconnected relationship between Buffalo and Niagara Falls.[143] Titled 'The Spirit of Niagara,' Figure 17 features a woman made of water to evoke the natural presence of Niagara Falls, with Buffalo's skyline clearly visible in the distant landscape. Placed centrally between Buffalo's skyline and the land of Niagara Falls, this 'spirit of Niagara' connects these two regions through the electricity she provides to illuminate the fairgrounds. Through this effective advertising imagery as well as the more tangible presence of shared electric power, the cities of Buffalo and Niagara Falls were more connected into a single, unified region at the Pan-American Exposition than ever before.

Electric power also served as the quintessential link between the Pan-American Exposition and the industrial attractions at Niagara Falls, particularly as the Adams

Powerhouse. As power traveled directly from the Adams Powerhouse to the fairgrounds, the Niagara Falls Power Company played a direct role in promoting this connection, as well as the company itself. Even during the Chicago World's Columbian Exposition eight years earlier, the Niagara powerhouses proved to attract fairgoers from Chicago while they were under construction. As one guidebook stated, "The visitors at Niagara Falls increased at the first evidence of active construction of the power-plant and probably reached a maximum number during the World's Columbian Exposition at Chicago, from which Niagara was found an interesting and restful sojourn."[144] Official guidebooks to the Pan-American Exposition further reinforced this connectivity, stating to visitors in Buffalo, "Go where you will, and on every side, the marvelous force of roaring Niagara is present...Niagara Falls is one of the principal attractions of the Pan-American Exposition, and in fact we consider it a part of the Exposition."[145] Both within the fairgrounds and on the trolleys that regularly transported fairgoers to Niagara Falls each day, promotional brochures reminded visitors, "It is the power of Niagara that propels you. We move forward now into the Age of Electricity."[146] Viewing the two cities of Buffalo and Niagara Falls as one region fueled by the same power, the Pan-American Exposition introduced millions of fairgoers to the industrial marvels and technological processes of electricity through a number of architectural elements and exhibits.

While the Pan-American Exposition at Buffalo in 1901 celebrated electricity as its primary theme, the World's Columbian Exposition at Chicago in 1893 served as its precedent in many ways. The installation of electric lighting, displays and performances in Chicago foreshadowed what Buffalo would do on a massive scale in 1901, and it served as a direct inspiration not only for the Pan-American Exposition but also the hydroelectric industries that emerged in Niagara Falls between the fairs. As Irwin has identified, the "tourist exhibitions of alternating currents set crucial precedents for the implementation of Niagara's electrical system."[147] Many have identified that it was the Westinghouse display, featuring Nikola Tesla's inventions, at the Chicago fair that finally convinced the NFPC to commit to using an alternating current system at the Adams Powerhouse in Niagara Falls. The Chicago fair was a precedent not only in terms of technology, but also in terms of architectural design. Many of the stylistic attributes that would characterize the architecture of the Pan-American Exposition were established in Chicago, where millions of tourists were first introduced to multiple displays of electricity. At a time when the national population was around 63 million, 27 million tourist tickets were sold to the World's Columbian Exposition in Chicago.[148] Both of these fairs were not only hugely popular, but they also created a massive spectacle of electrified architecture, influencing touristic rituals both within and outside the fairs.

Illuminating Architecture

Although they functioned in very different ways, the Adams Powerhouse and the Electricity Buildings at Chicago and Buffalo embraced a similar approach to architectural design. Particularly in terms of their exteriors, this diverse group of buildings tended to rely on traditional, European-derived forms of ornamentation that contrasted significantly with the technologically sophisticated components housed inside. Cladding innovation with an exterior appearance of tradition, the Electricity Buildings at the Chicago and Buffalo fairs incorporated neoclassical and renaissance revival elements into their facades. The contrast between these ornamental facades and the contents housed inside the buildings echoes the sharp divide between exterior and interior that also emerged in McKim, Mead and White's design for the Adams Powerhouse between the fairs. In many ways, the impetus to infuse these more conservative styles into architecture at both the fairs and the powerhouse itself reveals the broader historical context in which electricity emerged. Taking a closer look at the ways these exposition buildings were designed to celebrate electricity both inside and out, the following discussion identifies some of the common elements used by each of these buildings to convey specific qualities to tourists.

In general, the architecture of both the Chicago World's Columbian Exposition and the Buffalo Pan-American Exposition has frequently been criticized by scholars for their predominant use of European-derived styles. Consisting primarily of Beaux-Arts and neoclassical style buildings, the 'White City' at the Chicago fair was met with mixed reviews. While some critics celebrated the virtues of the City Beautiful movement embedded in Daniel Burnham's plan of the grounds, others viewed it as a regressive approach to design and therefore a missed opportunity for American architects and planners to contribute something unique to the global scene. Renowned architect Louis Sullivan famously criticized the fair's reliance on classical models, which he believed, "set back architecture by half a century."[149] The colorful Spanish Renaissance-inspired architecture at Buffalo's "Rainbow City" took only a marginal leap forward in design, by incorporating a different European-inspired style and brightly painted facades. In many ways, Sullivan's criticism was well founded and can be applied to both fairs, as their remarkably similar choice of European revival styles and plans exemplifies this slow progression. Innovation could be found elsewhere on the fairgrounds, however, in the exhibits where the most progressive and innovative contributions were on display.

Cladding innovation with tradition, the Beaux-Arts exterior of the Electricity Building at the Chicago World's Columbian Exposition significantly contrasted from the technological displays housed inside (Figure 18). Located next to the Mining Building at the corner of the Grand Basin, the building occupied about six acres and was built at a cost of $432,675. Designed by the Kansas City architecture firm of Henry Van Brunt and Frank Maynard Howe, the Electricity Building was "one of the first buildings in a general international exhibition solely devoted to that specific field."[150] In this sense, the very existence of the building was groundbreaking, introducing electricity to a world's fair on a massive scale for the first time. Architecturally, however, the building was designed in more traditional terms, revealing a curious departure from the innovative electrical exhibits that it was built to accommodate. Executed in a style that somewhat resembled a combination of Italian and Spanish Rennaissance ornamentation, the building featured a plan that contained features typically present in a church, such as a high-pitched roof, nave, and transept. Ornamental elements were prominent on the exterior, including columns, sculptures, and on the corners, "somewhat capricious open turrets...which in an early drawing appear as onion domes."[151] A pavilion was located at each corner of the building, topped with open spires rising 170 feet in the air. A hemicycle pediment with sculptures designed by Richard Bock adorned the main entrance at the south, with four-story tall Corinthian pilasters painted like scagliola with bronze capitals. Combining historicized Mediterranean influences, the Electricity Building represented a collage of European revivals rather than a uniquely American contribution.

While aesthetically conservative on the exterior, Chicago's Electricity Building utilized windows in its design in remarkably similar ways to the Adams Powerhouse. Designed to attract visitors to the exhibits inside, the Electricity Building featured far more windows than were required. Clerestories, skylights and multiple other windows provided plenty of illumination and ventilation to the interior, and pamphlets boasted that over 40,000 panes of glass were used in the building, more than any other structure at the fair.[152] Given that the majority of the building was powered by electricity and featured electric exhibits, these windows served a purpose that was more aesthetic than it was practical. As at the Adams Powerhouse, plenty of light would have been electrically provided to the interior with even half as many windows as were present, and a bolder concept would have been to minimize, rather than maximize, the use of glass.

Capitalizing on the close association between windows and light, however, the design utilized glass to convey the content of the exhibits inside. Merging natural light with electric light, these windows served at least in part as an homage to the power of electricity and the artificial illumination it could emanate from within. Furthermore, these windows provided passerby with an incredible glimpse into the exhibits, particularly when the electric displays made the building shine from the inside out at nighttime. As one tourist recognized, the building was "the most popular exhibit hall at the exposition."[153] In providing spaces for these popular exhibits, the architecture of the Electricity Building was not entirely separate from the tourist experience it shaped. As the *Chicago Tribune* remarked, the Electricity Building was "indeed a palace of light, and seen at its best, at night, when the myriads of sparkling gems of light and those greater ones which almost cause the sun to blush are shown in their fullness of number, it is a vision of richness of color and splendor."[154] Reversing the traditional use of windows to provide natural illumination to the interior, this nocturnal display of electricity 'caused the sun to blush' by radiating artificial light outwards into the night. These windows were therefore essential to the display of electricity inside, not for the natural light they unnecessarily provided, but for the artificial illumination they displayed at night to the exterior. Where other buildings at the White City were adorned with electric bulbs primarily on the exterior, the Electricity Building displayed this technological marvel from the inside as well. In this sense, the windows themselves became part of the display of electricity, transforming the building itself into a single, spectacular exhibit each night.

Celebrating electricity as its central theme, the Pan-American Exposition in Buffalo featured two buildings devoted to the subject, rather than one (Figure 19). Much like in Chicago, Buffalo devoted an Electricity Building to housing the majority of the electric exhibits on display. In conjunction with the overall aesthetic theme of the fair, renowned local architects E.B. Green and Wicks incorporated Spanish Renaissance revival style elements into the exterior design of the Electricity Building (Figure 20). The building was 500 feet long and 150 feet wide, providing 75,000 square feet of exhibition space inside, where the majority of the power-generating displays were also contained. While this building was considerably large, its size was relatively modest given the fair's theme of electricity. Rather than relegating electricity solely to this building, however, the theme was present throughout the entire fairgrounds. Situated between the Grand Canal to the west and the Electric Tower to the East, the Electricity Building was located adjacent to the prominent Court of Fountains. The main entrance to the building, located at the eastern end near the Court of Fountains, was spanned by a large arch with column supports. The pair of towers above the entrance was one of the most distinguishing features of the building, executed in the Spanish Renaissance style roof and pavilions. Describing the structure as a "long, low, inviting building," the Rand McNally guidebook to the fair observed, "the general ornamentation of the structure is frescoes in an interesting mixture of reds, greens and yellows."[155] This color scheme was in keeping with that of the Machinery and Transportation Building, which also featured some additional electricity exhibits. Applying Spanish Renaissance details where the Chicago fair architects had applied Roman and Spanish ones, the Electricity Building at Buffalo was generally in keeping with the pattern set by the precedents at the World's Columbian Exposition.

The Electric Tower

In addition to the Electricity Building, the Pan-American Exposition featured the Electric Tower as well, which served as the focal point of the fair much as the Ferris Wheel at Chicago had done. Designed by architect John Galen Howard to be "the artistic centerpiece of the Exposition," the Electric Tower soared to a height of 389 feet, making it visible from all parts of the fairgrounds (Figure 21).[156] Situated within a broad basin, the main body of the tower was 80 feet square and flanked to the east and west by long, curved colonnades that swept southward and terminated in open-air pavilions on both ends. These colonnades, which were approximately 90 feet tall, were adorned with "a system of decorative rusticated bands, which gave an aspect of great solidity to the base."[157] Forming a semi-circular space approximately 200 feet across, these colonnades extended the horizontal presence of the Electric Tower, which otherwise provided a primarily vertical impression.

Howard's design for the Tower also incorporated color and sculpture in order to pay homage to the relationship between Niagara Falls and the presence of electricity at the fairgrounds. In addition to placing nearly 44,000 bulbs throughout the exterior of the building, Howard also designed the building in tandem with a colorful scheme that evoked the spirit of Niagara in the daytime as well. Envisioned in conjunction with Charles Turner's color scheme for the fair, the Electric Tower featured a white exterior with blue, green and gold details. Occupying the new position created at the Pan American Exposition as the Director of Color at the fair, Turner described the color scheme as follows: "The tower itself is a cream white...tinted with blue, green, and gold, getting fainter until the top is reached, representing all that man has accomplished over the elements."[158] These tints of blue and green, which were intended "to be as near the color of Lake Erie as it was possible to get," created a visual connection to the hydroelectric power that the tower was designed to celebrate. Several groups of statuary, designed by sculptor Karl Bitter, were also incorporated into the building in order to envision this connection to the Niagara waterways and Great Lakes region. Located primarily in the wings of the colonnades, these sculptures were "designed to symbolize the great bodies of water which are tributary to the stupendous cataract."[159] With separate figures representing each of the four major rivers and the Great Lakes, these sculptural elements further emphasized the significant role that man's power over nature played in the presence of electricity throughout the fairgrounds.

Placed at the edge of the Court of Fountains, the Electric Tower served as the focal point for a series of interconnected water features present throughout the fairgrounds. Fountains, lakes and canals were woven throughout the plan of the fairgrounds, not unlike at the lagoons and Grand Basin at the Columbian Exposition. Led by electrical engineer Luther Stieringer and Henry Rustin, the superintendent of the mechanical and electrical operations at the fair, the design for these electrically lit fountains and water features were directly integrated into the overall plan of the fair. Visitors could take boats and gondolas, or traverse by foot over bridges, in this system of waterways that echoed Olmsted's park system that weaves throughout Buffalo. Located at the northern end of the court, the Electric Tower was directly connected to this system of waterways at the base of the building. There, Howard incorporated what he called "a majestic fountain and scheme of brilliant illumination at the basin and the base of the tower."[160] This dramatic display essentially served as a miniature waterfall that was designed to directly reflect the presence of Niagara throughout the fairgrounds (Figure 22). Pouring out of a niche in the Tower about 70 feet high, the water tumbled into the basin below, where a fountain recirculated the water to have it bubble up again to a height of four or five feet. As one guidebook described, this water featured,

> It pours out 13,000 gallons of water per minute, which is broken into an immense water screen or veil by means of a deflector. On each side of the center of the structure are located two groups of water jets, with 26 large pillar jets, throwing water to a height of 50 feet...the splendor of the scene under the play of colored lights of various intensity is indescribable. Under the water in the basin are ninety-four searchlights, each lighting up its individual water display.[161]

Utilizing multiple lights to illuminate the water at night, this miniature waterfall was directly integrated into the architecture of the Electric Tower. Merging this representation of Niagara Falls with the building itself, this iconic waterfall provided a popular tourist attraction that celebrated the architecture of the fairgrounds in tandem with the source of its electric power.

The height of the Electric Tower was one of its most impressive features, marking a stylistic departure from the other buildings on the fairgrounds. Aside from a few exceptions, such as the Eiffel Tower at the 1889 Exposition Universelle in Paris and the Ferris Wheel at Chicago, the height of the Electric Tower distinguished the building from the typically three-story high architecture more typically seen at world's fairs. Several design features were incorporated to emphasize the impressive height of the Electric Tower. Rising from the main shaft of the tower at 200 feet, Howard designed an elaborate entablature of diminishing proportions to crown the building. A searchlight was placed atop the building at a height of 360 feet, and the light it emanated could reportedly be seen from Canada. Extending the presence of the building and the exposition for miles around, this searchlight effectively used electric light to reach out towards the source of its power at Niagara Falls.

Soaring higher than any other building in Buffalo at the time, the Electric Tower also distinctly referenced other early skyscraper designs in the city. Over one hundred feet taller than the city's highest buildings, which included St. Paul's Episcopal Cathedral (275 feet), Erie County Hall (270 feet), and the Great Northern grain elevator (188 feet), the Electric Tower was visible from nearly all points of the city. Utilizing a similar steel framework construction to Adler and Sullivan's Guaranty Building (167 feet) that was completed just five years prior to the Pan-American Exposition, Howard's design for the Electric Tower incorporated modern building materials in methods into an otherwise relatively conservative architectural context on the fairgrounds. Constructed of a steel framework clad with staff walls, the Electric Tower represented a more modern approach to architecture than the other buildings on the fairgrounds. While the majority of the buildings at the Pan-American Exposition utilized iron and lath frameworks clad in staff, the construction of the Electric Tower reflected the architect's inspiration from early skyscraper designs. Howard acknowledged this influence, stating,

> As regards the architectural design of the Electric Tower, it may be called essentially American. As in the other buildings, use has here been made of classic and Renaissance forms, and certain 'influences' may perhaps be pointed out by the critic; but it shows the trend of thought in this country, and may be taken as an example of modern American architecture.[162]

Although the steel framework was adorned with Spanish-Renaissance derived ornamental motifs, the skeletal forms of the structure were still evident in some places. The shaft of the tower provided the best views of this framework, where the staff was arranged as a "fantastically perforated work, through which is indistinctly revealed the massive framework of the tower."[163] The illumination of the building also emphasized this use of steel, where bulbs were placed within openings in the staff in order to "produce a remarkable effect when lighted from within."[164] Drawing attention to the structural skeleton of the building much like a skyscraper, this illumination scheme featured glimpses of steel amongst the otherwise more traditional Renaissance inspired elements.

Inside the building, a combination of rooms similarly reflected the skyscraper approach to interior plans. In addition to visiting the tall, window-filled base of the Tower, fairgoers were invited to travel to the upper floors by an electric-powered elevator. This elevator carried passengers to "the various floors which are devoted to the different purposes of the Exposition, such as reception rooms, offices, restaurants, belvederes and amusement halls. A large restaurant and roof garden at a height of 200 feet gives the diner and broad and beauty view of the exposition and the surrounding landscape."[165] By including a restaurant, shopping area, observation deck and multiple rooms, Howard's plan for the Electric Tower was specifically designed for tourists as the primary inhabitants. Furthermore, these different consumer regions were aligned along a vertical axis that was accessed by an elevator, in keeping with the internal usage pattern that had already been established by early skyscrapers, such as the Guaranty Building, by that time. As a temporary building designed solely for the Pan-American Exposition, of course, the Electric Tower did not function in the same way that a true skyscraper would have. Howard's reliance on classically inspired motifs, sculpture and other purely ornamental elements was also hardly as innovative or structurally expressive as the Guaranty Building just six miles away. As a focal point for the Pan-American Exposition, however, the Electric Tower represented an architectural step towards modernity that was bolder than most of the other buildings on the fairgrounds, or at the World's Columbian Exposition for that matter. Embracing the steel skeletal frame, light-filled walls of windows, and mixed-use internal program of the early skyscraper, the Electric Tower, like the hydroelectricity that powered it, pointed the way forward into the incorporation of modern elements at the architecture of world's fairs that was to follow.

The Electric Tower also embraced a performative aspect of architectural display, drawing thousands of tourists to experience the culmination of an illumination ritual that transformed the fairgrounds each night. While Chicago's Columbian Exposition featured electric lighting on the exterior of fair buildings, the Pan-American Exposition, celebrating electricity as its primary theme, incorporated architectural lighting not only as a display, but also as a performance. Every evening at dusk, fairgoers gathered in the Court of Fountains to witness the precise moment when the bulbs on the exterior of the buildings would be turned on. Rather than merely flipping a switch, fair organizers designated this nightly illumination process a 'ceremony,' and it proved to be an extremely popular attraction. Countless popular magazines described the illumination, marveling at the transformation of the buildings through this electric performance. As one tourist described,

> The time fixed for the ceremony of illumination is half past eight, just as the summer twilight is deepening into darkness. A few moments before the appointed hour, one perceives the bulbs of electric light along the paths and in the buildings diminish in intensity until they become mere tiny specks of flame which fade away. There is a deep silence, and all eyes are riveted on the Electric Tower. Suddenly, in the splendid vertical panel with four brooches which decorates its center, there is a faint glow of light like the first flush of sunrise from behind a mountain peak. It mounts and spreads, at first gradually, with dignified clarity, then with a swifter effulgent pervasiveness until the entire territory of the Fair has been metamorphosed into a gorgeous vision of dazzling towers, minarets and scintillating gardens. The Spanish Renaissance scheme of color is gone, and in its stead we have a veritable fairy-land; the triumph not of Aladdin's lamp, but of the masters of modern science over the nature-god, Electricity.[166]

The Electric Tower served as the focal point for this ceremony, which utilized the exterior of the building as the central node from which the other lights would 'spread' like fire. The gradual pace of the illumination was a key component in captivating the audience's attention for an extended period, wherein the color of the bulbs would also change from pink to yellow. One visitor recounted this process in *The World's Work*, stating, "You have hardly realized the scene as it appears in the dusk, when the rows of posts tiny dots of light appear in clusters, like little pink buds in a nosegay. Then the pink points grow brighter and change their hue, and in another moment the full illumination bursts forth, and the whole great court becomes luminous with a soft brilliancy that does not tire the eye."[167] Witnessing this scene over an extended moment of time, visitors were confronted with what many believed was "a new kind of brilliancy. You are face to face with the most magnificent and artistic nocturnal scene that man has even made."[168] The sensory aspects of this illumination performance were further amplified by the inclusion of an auditory aspect to the ritual. Accompanying the gradual illumination of the buildings each night, a live band played 'Nearer My God to Thee,' further dignifying the ceremony with a musical component. Using light, color and sound, this precisely timed illumination event provided tourists with a spectacular, fleeting moment that would only last as long as the fair itself.

Although the Adams Powerhouse began transmitting electric power from Niagara Falls in 1895, by 1901 the use of electricity on architectural exteriors was still reserved primarily for special events like the fair. Notably, there is no evidence that suggests that the Adams Powerhouse engaged in nighttime architectural illumination: no nighttime images, postcards, descriptions or documents indicating that the NFPC made any effort to electrify the powerhouse exterior. Although the powerhouse operated twenty-four hours day, no exterior illumination displays were installed to attract attention at night. Furthermore, while the building was lit inside for employees to work at night, tourists were not welcome after five in the afternoon. This lack of exterior architectural illumination at the Adams Powerhouse suggests that this type of display was still too costly to perform regularly in the early twentieth century, and was reserved for major special events such as the Pan-American Exposition. Additionally, the NFPC may have chosen to forgo exterior illumination in order to respect the natural rhythms of day and night, further conveying their corporate humility in the face of natural forces. Furthermore, it indicates the primary interest in the NFPC was not tourism, but functional, economically efficient operations, unlike the Pan American Exposition.

At the Pan-American Exposition, the illumination ritual transformed the exterior of the buildings into a spectacular nocturnal display that played a significant role in convincing fairgoers of the inherent value of electricity. The practice of visiting the fairgrounds at night was still a relatively new tourist phenomenon as well, one which "overwhelmed the public, while entertaining them in great numbers and processing all of them into believers in and eventually enthusiastic consumers of the fruits of evolving technology of all sorts."[169] Crediting the Buffalo fair with a substantial influence on subsequent displays, critic Ernest Knauffet wrote in 1901, "Nocturnal architecture! Not in the textbooks, no chair devoted to it in the universities, but it is a department of architecture that the twentieth century will see developed, and the Pan-American Exposition is responsible for it."[170] Over a century later, architectural historian Dietrich Neumann addressed the integration of electricity into architectural displays at length in his edited volume *Architecture of the Night: The Illuminated Building*, where he acknowledged the impact that the Pan-American Exposition had on subsequent nocturnal illuminations. At the fair in Buffalo, he remarked, "the awe inspiring moment at dusk, when all lights are switched on simultaneously, turned into a choreographed ritual, eagerly awaited by visitors."[171] While the permanent illumination of architecture was still at least a decade away in cities like New York and Chicago, the touristic experience of viewing architecture at night is partially rooted in the presence of dramatic illumination rituals such as that at Buffalo. As a result of its popularity at the fairs, nightly tourist visitations later became a common touristic practice.

Framing Tourist Views

Photographs played a large role in popularizing these ethereal light displays, capturing still images of this temporal ceremony for tourists to remember and armchair travelers to witness from afar. Tourist experiences, impressions and memories of the fair's illumination ritual were carefully framed by the official photographer C.D. Arnold on behalf of administrators. Arnold's photographs not only depicted, but also constructed the publicized 'image' of the fairs. Arnold's photographs indicate the ways that architecture played an integral role in constructing public perceptions surrounding the budding industry of electric power generation and transmission at the fair. Photography and tourism were explicitly intertwined at the world's fairs, with resulting effects that persisted long after the era of the fairs. The fascination that accompanied these spectacles coincided with "an awareness that it would all soon vanish, that its beauty were the things of just a day...and then they would be left with only their memories, souvenirs and pictures."[172] The simultaneous sense of awe and nostalgia was integral to the development of souvenir photograph collections, which were created, in part, to reverse this sense of impermanence that accompanied the quick disappearance of the fairs. For the world's fairs, where a sense of brevity was so present, "photography was a campaign to capture in more permanent media and render memorable that which was as ephemeral as the reflection of substance in water."[173] The very existence of these souvenir photographs reveals a cultural urge to perpetuate the fairs into a more pervasive historical moment, lasting long after the fair has been physically dismantled. By providing images of the fairs, these souvenir photographs ensured that these fleeting events would remain forever present in cultural history, thereby making a permanent mark on the collective memory of the fairs.

Souvenir photograph collections impacted not only the perception and remembrance of fairs, but they have also played a fundamental role in touristic ways of seeing at large. The images in these collections created "visual expectations of Americans as they encountered their nation and the rest of the world through travel or, more likely, through consumption of these visual materials."[174] Tourism became a fundamental method of interpreting and constructing identity during the emergence of the modern age. The era of the expositions was a significant moment in modern tourism, and thus "the tourists to the Fair may have been trying to understand themselves as modern subjects in the midst of a rapidly changing world."[175] Fair souvenirs served as an extension of, or substitution for, travel, reflecting and perpetuating a broader cultural tradition of using tourism as a way of understanding oneself and modernity, as MacCannell has suggested. Therefore, these "published images shaped expectations and affected experience itself, refiguring what had been seen, depicting what should have been seen, or offering an ideal perspective that only the photographer could record."[176] In this way, an examination of these souvenir photographs reveals the manner in which these images influenced touristic ways of looking that extended far beyond the fairs, by consistently editing what should be seen and how the tourist should see.

Fair administrations at the Chicago and Buffalo Expositions went to great lengths to control the fair's publicity through photographs. In an effort to establish control over images of the exposition, fair administrators gave detailed legal rights to a singular enterprise, that of C.D. Arnold, as the sole official photographer of both the World's Columbian Exposition and the Pan-American Exposition. By granting Arnold with exclusive rights to produce and sell images, administrators were able to craft a specific public image of the fairs. Overseeing the distribution of photographs in advertisements and souvenir collections, administrators worked closely with the official photographer to craft a specific public perception of the fair. Administrators also placed substantial restrictions on the actions of amateur photographers at the fairs, in an attempt to prevent them from creating or circulating images that diverged from the official agenda or from profiting the fair administrators. These restrictions, and the official photographs themselves, reveal the controlled advertising image that tourists received in souvenir collections.

As the official photographer of these fairs, C.D. Arnold played an essential role in framing the tourist view of architecture, electricity and ceremonies at both Chicago and Buffalo. Born in Ontario, Canada in 1844, Arnold moved to Buffalo when he was about twenty years old. After having gained an interest in photography during his time as a traveling salesman there, he traveled through Europe taking numerous architectural photographs that he later published with moderate success. By the 1890s, he returned to Buffalo and established his home and professional photography studio on Bidwell Parkway near Elmwood Avenue, where he remained until his death in 1927. In the winter of 1892, he traveled to Chicago to photograph the construction of some of the buildings at the future World's Columbian Exposition in an attempt to obtain the highly coveted position of Official Fair Photographer.

After approving of his photographs of the Chicago fair's construction, the administration granted C.D. Arnold and his partner, Harlow D Higginbotham, an exclusive right to commercial photography inside the grounds. Higginbotham, the son of the President of the Exposition's Board of Directors, was largely granted the title in name only, whereas Arnold quickly became known as the true official photographer. Arnold's designation was accompanied by a long list of benefits: $2000, copyright and commission on all images, the ability to sell any photographs to guidebooks, journals or newspapers, the right to fill separate orders from journalists or businesses who had displays on the fairgrounds, as well as the opportunity for further income by filling any special orders placed by visitors to the fair.[177] In 1901, Arnold was again granted access as the sole official photographer of the Pan-American Exposition in Buffalo, with a contract that was largely similar to that he had been granted in Chicago. The impact of his work at both fairs was a series of photographs that "not only primed visitors, but also served to remind them of their experience long afterward."[178]

In relation to the goals of the fair administrations, Arnold was an ideal choice of photographer, as his images celebrate architecture in a manner that perfected the art of advertising the expositions. Arnold's photographs were extensive, controlled and expensive, far more so than previous official photographers at other expositions, such as Paris' Exposition Universelle. He produced platinum prints of his images, which was an expensive technology that was associated with artists rather than journalists, underscoring the impression that the photographs he produced were fine art. A souvenir image by C.D.

Arnold could range from 30 cents, for an 8” x 10” print, to $1.50, for a 12” x 14” print, at a time when the average income was about 11 dollars a week.[179] In addition, if a visitor wanted an image of an object that was not part of any of Arnold’s popularly available photographs, they could specially commission shots for $5, 10 times the 50 cent price of fair admission.[180] With such exclusive, pervasive access to these resources and the fairgrounds, Arnold effectively established a monopoly from which he heavily profited, making his photographs seem synonymous with the fair itself.

Both in Chicago and in Buffalo, Arnold’s photographs feature a world of architecture that is monumentalized by its classical proportions and scale. The utopian nature of the fair, as Hales reflects, “survived best not in reality but in myth- a myth that reached its clearest, most perfect, and most persuasive embodiment in the pictures of Charles Dudley Arnold.”[181] The majority of his images feature buildings as the primary subject, and his use of perspective reiterated his interest in architecture by “reducing the surroundings to the role of a setting.”[182] Many of his images are framed in the foreground, often with bodies of water, fountains or pathways leading the viewer’s eye towards the featured architectural subject matter. Arnold also captured photographs of impossible views from places such as the roofs of buildings that were often inaccessible to the average fairgoer. With these idealized perspectives, Arnold photographically imagined the architecture of the fairs as isolated objects that existed outside the chaos of human spectacle of the exposition’s reality, thus depicting the fair in a seemingly untouched, perfect form. Arnold’s use of bird’s eye perspectives echoed a larger developing trend in architectural photography, which thereby influenced touristic experience. Historian Amy Ogata states, “By 1889, when visitors ascended the Eiffel

Tower to look down on the city of Paris, viewing the exposition from above had become a quintessential experience of fair tourism."[183] Many of Arnold's photographs, including Figure 23, utilize a perspective that encouraged tourists to climb to great heights to see an overarching view of the city. By illustrating the fair from a privileged perspective that only he could access, Arnold's images reflect his control over the architectural scene, just as the administration had control over the distribution and access to the scenes themselves.

Arnold's frequent omission of people in his photographs reinforces his interest in the monumental qualities of architecture, rather than in the chaotic spectacle of the fairs. By taking the photographs early in the day, before the crowds arrived, Arnold intentionally avoided including people in his images, aside from an occasional human figure who was typically used only to provide a sense of scale to the architecture. This technique "lent a sense of quiet and decorum, an aesthetic order to what in reality were bustling thoroughfares and crowded exhibits, made so by the disorderly meandering of huge crowds of visitors."[184] Although the noisy crowds would likely have been a predominant experience of the fairs to a visitor, Arnold's photographs, which were used largely to remember the fair by those same visitors, included none of those theatrical crowds.

The quiet emptiness of Arnold's photographs suggest not only his emphasis on the pristine, majestic qualities of architecture, but also on his direct control over the public understanding of what tourists should value at the fair. Arnold avoided crowds because they "would draw the eye away from the realm of metaphor and declamation suggested in the vehicle of architecture ...crowds could suggest only disorder, diversity, multiplicity of intent, and variant points of view."[185] By eliminating crowds from his images, Arnold ensured the singular authority of his own perspective, on behalf of the fair administration. Instead of the uncontrolled spectacle of chaos, the images evoked "a stage set, a clean, finished artifice, at once a cultural index and a cultural agent, inhabited, by and large, in imagination rather than in reality."[186] In this way, these images suggest Arnold's emphasis on architecture as the primary destination for tourists at the fair, thus shaping their experience and perceptions of the primary objects of value to seek out amidst the crowds.

Many of Arnold's photographs not only emphasize architecture, but also celebrate the advancement of electricity. He produced several night photographs at both the Chicago and the Buffalo fairs, which featured the exposition grounds illuminated by thousands of lights. Figure 24 serves as a typical example of Arnold's work at the Pan-American Exposition, demonstrating not only his broad influence on tourist perceptions but also his technical prowess as a photographer. By capturing this nighttime view, Arnold not only featured the supremacy of American technological developments, but also demonstrated his own confidence and skilled ability as a photographer. Taking photographs at night was a difficult task at the time, one that required excellent skill, expensive and heavy equipment, as well as significant patience. In order to successfully capture the nighttime images at the Pan-American, Arnold took exposures lasting about twenty-five minutes each in order to ensure proper lighting.[187] This long exposure time was also a contributing factor to the absence of people in his nighttime images. In Figure 24, Arnold not only captured the correct exposure, but also managed to feature the most picturesque aspects of the scene, using water to blur the line between reality and fantasy by presenting the reflection of the lights. In this way, Arnold not only encouraged the tourist experience of night viewing, but also emphasized the improvements of both electrical and photographic technology in ways that easily aligned with the agenda of fair administrators and electrical corporations that funded the fair.

Arnold's monopolistic control over the exclusive ability to photograph extensively at the fairs, and thus his sole influence on the perception of the fairs, raised significant opposition from amateur photographers. In the late nineteenth and early twentieth centuries, a large population of amateur photographers emerged alongside the popularity of the world's fairs. Photographic technology continued to improve, and the development of smaller, more inexpensive cameras and faster production times made photography available to a broader audience. At the time of the World's Columbian Exposition, there were "about sixty societies and clubs in the United States,"[188] and roughly "100,000 amateur photographers in the United States at the time, most of them affluent enough to go to the fair."[189] Despite these relatively large numbers, only about "2000 amateur permits were sold during the duration of the Chicago fair."[190] This low percentage of amateurs at the Chicago fair was a direct result of the strict regulations put in place by fair administrators, in order to curb the production of images that were alternative to Arnold's officially sanctioned photographs.

The Paris Exposition Universelle set the precedent for limitations in 1889, and many of the official photographs from that fair reflect a similar compositional quality to Arnold's images. In Paris, "amateurs and professionals alike paid an entrance fee for their cameras, but no monopoly was granted to a single firm, and no limit on camera size."[191] In Paris, there were two major photographic firms, that of Marius Bar and that of the Neurdien Brothers. A rare personal photograph album in the Kroch Division of Rare and Manuscript Collections at Cornell University contains 99 prints by the Neurdien Brothers at the 1889 Exposition. Photographs such as Figure 25 demonstrate the stylistic similarities between these official photographers and C.D. Arnold. This image, which precedes Arnold's photographs, utilizes a bird's eye perspective to emphasize, like Arnold, the monumental qualities of architecture and the orderliness of the fair. Like many of Arnold's images, this photograph demonstrates an impossible view that celebrates the triumph of architecture as a symbol of Western progress.

While the effort to control images did not originate at the Chicago fair, the World's Columbian Exposition set the strictest regulations of the fairs. They effectively reduced the existence of unofficial photographs by placing hefty fees on amateur photographers, as well as limiting the size of both their cameras and their photographs. A fee of two dollars a day (four times the cost of admission) was required in order to bring a small hand held camera into the fairgrounds, with an additional one dollar cost for permission to photograph the street in Cairo on the Midway. Accompanying this cost, visitors were required to sign a release form stating they would not use any images for commercial or public use. If a visitor did not have a camera, then small, tourist oriented Kodak cameras were available to rent for another two dollars a day, but no tripods were allowed, and the images produced could be no larger than 4" x 5."[192] Producing any images in this condition would have been immensely difficult, as there were no darkroom facilities available on the grounds. However, some nearby hotels aimed at subverting this policy and attracting amateurs, such as the South Shore Hotel, by providing makeshift darkrooms for their guests.

These regulations were designed to prevent high quality images from being produced and circulated, which had the potential, as alternative perspectives, to subvert the administration's message in Arnold's carefully controlled photographs. The nature of these restrictions were aimed, "not so much at the causal tourist but at the amateur photographer whose equipment might well demand a tripod to steady a large camera with slow film."[193] The lack of darkrooms and proper equipment prevented amateurs from taking quality photographs, but would not have largely concerned the average tourist who wanted to take an informal snapshot. Today, however, few of these purely touristic photographs exist, and the image of the world's fairs remain largely as it was put forth by the administration through official photographs.

In response to these regulations, amateur photographers responded with a battle against the administration, largely through publications central to the amateur community. *American Amateur Photography*, a magazine led by Alfred Stieglitz at the time, repeatedly sent letters of protest demanding a change in the rules, effectively "arousing its own miniature storm of pupils and progressivist protest."[194] In the end, the administration did not budge, although the protests did result in the hiring of a well known landscape photographer, William Henry Jackson, to produce 100 11" X 14" images of fair as it closed. Jackson's photographs, however, did not comply with the administration's Arnold-esque image, and the poignant photographs of construction workers and debris that he created were never produced, at least not without significant editorial alterations.[195] Recognizing the negative publicity that this photographic battle created for fair administrators, however, the Directors of the Pan American Exposition greatly reduced the fees for amateur photographers in Buffalo, although they still managed to grant Arnold exclusive access to the fairgrounds as the sole official photographer of the fair.

This miniature battle over the control of alternative visions reveals more about the fair administration's urge to control the fair's image than it does about the photographers themselves. Harris reflects, "Fair officials, with their careful choice of official photographers and licenses for the cameras of individual visitors, acknowledged just how critical the control of images actually was."[196] The existence of this controversy demonstrates the importance placed on photography as the primary creator of perception during these massive cultural events. The administrative desire to control the public image indicates that world's fairs can be seen as "spectacles of contestation in which opposing groups and interests battle to control the production, representation and consumption of spectacular imagery and symbols."[197] In this way, exposition photographs can be utilized from a historiographical perspective, as they reveal the concepts and agendas that contribute to the creative construction and production of public notions of tourism, photography and architecture that persist into this day.

Despite these contested regulations, most amateur photographs of the fair do not significantly differ from Arnold's, thus revealing the profound impact of his images on the photographic tradition. Stylistically, many amateur images use compositional techniques that are similar to Arnold's dictum. *The World's Fair through a Camera: Snapshots by an Artist*, is a rare souvenir collection that features amateur photographs taken by F. Dundas Todd at the Chicago Exposition. The term 'amateur,' it is important to note, did not always indicate a hobbyist, but instead an artist, as even Steiglitz was considered an amateur in that he did not work for commercial profit from a client, but rather for artistic motivativations. Due to the heavy restrictions at the fair, few collections of amateur images exist, making this one an incredible insight into the photographic style of these depictions. These images, seen in Figure 26, feature architecture with a sense of monumentality and an emphasis on pure, uninterrupted form that echoes Arnold's characteristic style. These stylistic similarities were not confined to this particular album, as historian James Gilbert states, "Despite the objections to stringent rules and an undercurrent of criticism of Arnold's vision, there is considerable evidence that the monumental and picturesque were also principles of the amateur aesthetic code."[198] Therefore, although the amateurs attempted to combat Arnold's monopolistic control, they were largely unable to escape the pervasive impact of his aesthetic style on their own ways of seeing.

Arnold's official photographs not only affected the perception of architecture for fairgoers and armchair travelers alike, but they also continue to act as touchstones of memory in our archives today. Both then and now, official fair photographs effectively "shape public perceptions of the Fair, attract attention and visitors through publicity, and leave a lasting legacy of meaning for future recollection through its meticulous record-keeping and archival preservation."[199] As a result, these official photographs may tend to influence historical research today in much the same way that they influenced fairgoers at the turn of the twentieth century. While many archives contain extensive materials related to fairs, these collections tend to reflect the predominance of mass-distributed souvenir images rather than amateur photographs. Although the occasional scrapbook containing personal images does appear in some archival collections from time to time, the majority of archival collections for world's fairs tend to include the same groups of official images produced and distributed in different formats for tourists to purchase. Gilbert, a prominent scholar on world's fairs, discusses the influence of these official images on the historiography of these expositions:

> To the present day observer looking back on this period of photographic history, the tendency is to believe that Arnold's is the only perspective and that he and the fair administration successfully shaped how visitors saw and remembered the fair and how the rest of the public imagined it....And so we are left with a view of the fair that was intended by those who planned the Exposition.[200]

Although it is unfortunate that amateur images rarely survive in archival collections, the consistent presence of these official photographs can still reveal much about the absence of other perspectives. For instance, very few official photographs depict interior scenes in significant detail, perhaps partly due to difficulties in lighting conditions, and therefore only a handful of images of actual exhibits survive. Those that do depict the exhibits, displays and events that occurred inside the buildings tend to be produced and published in professional journals that were interested in the specific content of the exhibit at hand. In conjunction with these absent scenes, the sheer number of mass-produced photographs in archives today demonstrates the lasting influence of a small group of official photographers in shaping the ways of seeing architecture, both through tourism and photography. These mass-distributed official photographs reveal an intrinsic relationship between the creative construction of the fair and the creative construction of the souvenirs of the fair. Therefore, while they only provide one style of view, these official photographs provide excellent evidence of the subjective methods of control used by fair administrators and their official photographers in shaping touristic ways of seeing, both during and after the fairs.

Electrifying Displays

When creating and installing their displays, exhibitors struggled to identify the best ways to both inform and captivate the visitors they anticipated would tour the Electricity Building. In doing so, they each utilized unique methods to both educate and entertain the general public that made a substantial impact on the development of industrial architourism in the decades that followed. During the planning stages, these companies first attempted to identify the demographics of their anticipated audiences. During the time they prepared their exhibits, one journal estimated that the type of visitor who attended the World's Columbian Exposition without technical knowledge or experience would outnumber professionals by one thousand to one.[201] With predictions like these, industrial corporations attempted to design exhibits that would appeal to a broad audience rather than a specialized one. Appealing to the casual tourist, who may enter the Electricity Building with little to no prior knowledge of the subject, corporations created displays that attempted to attract, rather than purely educate, viewers. Resulting from these motivations, many of the displays relied more on spectacular methods than on didactic ones.

The Chicago fair served as a precedent not only in the physical implementation of electricity on the fairgrounds, but also in terms of the architectural characteristics of the display techniques, educational qualities and entertainment methods utilized in the exhibits found in the Electricity Building there. Inside, company-sponsored exhibits relied on a combination of display techniques that aimed to educate and entertain the general public in varying proportions. Elaborate displays by three major companies, Western Electric, General Electric, and Westinghouse, dominated the floor of the Electricity Building, but the exhibition space was also peppered with smaller booths featuring marvels such as the American Bell Telephone, Elisa Gray's teleautograph and Edison's kinetoscope. While in the building, visitors could witness a long distance phone call, listen to a live orchestra playing in New York City, or watch a short motion picture on Edison's celluloid film. The variety of exhibits, both interactive and demonstrative, was astounding to many visitors. As one remarked, "Perhaps the portion of the World's Exposition in which America is far ahead of all in competition is the Palace of Electricity; here she is seen in her natural splendor, eclipsing by her dazzling light ever other nation."[202] Occupying the majority of the building, the large-scale exhibits presented by Western Electric, General Electric, and Westinghouse, encapsulated the diversity of ways in which electricity could be celebrated, understood and utilized by the millions of visitors who witnessed their presentations.

One of the most popular displays inside Chicago's Electricity Building was known as the 'Tower of Light,' designed for General Electric by Thomas Edison (Figure 27). Prominently located in the center of the main exhibition floor, this tower was covered in colorful incandescent light bulbs and rose nearly the entire height of the building. The top of the tower was crowned with a large model of the Edison light bulb, made of over 40,000 prisms of glass and wired to an iron framework inside the tower. The bulb itself was ten feet high, and required eight men working together for five weeks to wire it together.[203] Edison reportedly invested half a million dollars in constructing this display, which "was the first structure designed entirely for its nocturnal appearance,"[204] and it became an instantaneous tourist attraction at the Chicago fair. As the exhibit that “attracted the most interest from the layman,” the tower of light was a spectacle of light and color that did not have to be understood in order to be appreciated.[205] The *Chicago Tribune* identified the tower as “by far the largest and most striking exhibit of the building,” describing the “tall shaft extending almost to the roof, with a colonnade about its base, the whole studded with miniature incandescent lamps arranged in geometrical figures in red, orange, and purple.”[206] These lights were wired to a switchboard nearby, “so that a variety of combinations both of shapes and colors may be thrown into action by the simple pressure of the proper keys.”[207] The motion created by the twinkling of lights in different colors and patterns was further amplified by musical accompaniment, wherein the changes in illumination “are rung to the tune of waltz music, which adds to the charm of the display.”[208]

Featuring a combination of flashing lights, multiple colors, soaring height and sound, Edison’s tower of light was hardly a subtle display. These exhibit techniques aimed to attract, rather than educate, the viewer, and even the *Chicago Tribune* acknowledged, “From a scientific point of view the tower has no interest whatever, nor is it artistic or original in design, but as a spectacular achievement it is an undoubted success, if judged by the throngs that view it.”[209] Evidenced by the popularity of the exhibit, displays such as the Tower of Light successfully appealed to the average tourist by providing spectacular demonstrations of electricity that could be appreciated with little to no educational understanding of how it worked. This type of exhibition technique, which relied on a barrage of sensory cues, emerged in multiple examples seen at both the Chicago and Buffalo fairs.

Unwilling to completely forgo appealing to the few experts and professionals that were highly educated in this field, each of the corporations also found ways to include some of the more nuanced technical aspects of electricity into their exhibits. While attracting the average tourist was essential for product promotion and profit, it was also important to convince experts, engineers and interested corporations that electricity could be safe, useful, and innovative in a variety of contexts and industries. In conjunction with the spectacular displays seen in examples such as the Tower of Light, some exhibits also incorporated more specifically educational content at both the Chicago and Buffalo fairs. Just north of the Tower of Light, for instance, General Electric also included an exhibit of 2500 different types of commercial light bulbs (Figure 28). Presented in a display reminiscent of a cabinet of curiosity, the exhibit featured "different sizes, shapes, styles and types of lights made." While hardly a thrilling exhibit, this presentation was described as an "educational display of a very high order. It is the most complete exhibit of incandescent lamps the world has ever seen."[210] Similar methods were utilized in the Western Electric exhibit space, which included several groupings of switchboards in order to demonstrate the diversity of equipment the company produced. Labeling all parts of the switchboards and arranging them in chronological order, Western Electric presented this equipment in a similar manner to the General Electric light bulb display.

Acknowledging these educational corners of the otherwise highly entertaining room of exhibits, one journalist reflected, these "will prove less interesting to the average visitor, but to the student and to the electrician it is one of the most attractive."[211] In contrast, however, displays such as the Tower of Light, and the Tesla ring, utilized a combination of light, motion and sound to create an exhibit that was designed primarily to entertain viewers. Addressing the different approaches embedded in these exhibits, one visitor observed, “Few of those who witness these performances understand their portent, however, but though of extreme interest they appeal also to the untutored eye.”[212] While the majority of electrical exhibits at both the Chicago and the Buffalo Expositions incorporated spectacular displays that were designed primarily to entertain, it is important to remember that many companies also integrated educational content into their exhibits as well.

The lines between spectacular and educational forms of tourist engagement with electricity were even more blurred at the Pan-American Exposition than in Chicago. While the exterior illumination of architecture provided a spectacular demonstration of electric power each night, the exhibits inside these buildings provided a somewhat more educational encounter with electricity at the Pan-American Exposition. Once they had witnessed the illumination ceremony, tourists were then invited into the buildings to witness the source of that electric power. Putting the technology and mechanics used to generate the electricity on display, several exhibits at the Pan-American Exposition turned this perfunctory aspect of powering the fair into an educational opportunity for tourists. Boasting about this feature, one guidebook to the fair stated, “The development of electric power is illustrated in a very comprehensive manner; working models of many of the great plants are on exhibition.”[213] Moving past the purely spectacular display of electricity seen at the exterior illumination displays of Chicago, the Buffalo fair encouraged tourists to learn how these lights were powered, by creating displays about power generation that also doubled as actual power sources for the fair itself.

Powering the Exhibits

The Pan-American Exposition was powered by a combination of three separate power plants, each of which was open to tourists in varying degrees. Dividing tasks amongst these three plants, "one [was] devoted chiefly to exterior decorative illumination, the second to power for service, and the third largely to pumping machinery for the operation of most of the various fountains."[214] Located in three distinct buildings, each of these facilities accommodated tourists in unique ways. The Electricity Building contained the facilities used to power exterior lighting, the Machinery and Transportation Building contained the facilities used to power the pumping machines for the fountains, and the remaining facilities were housed in their own Service Building on the northwest corner of the fairgrounds. Each of these three facilities was accessible to tourists, who could view the equipment in action as it generated electric power for various portions of the fairgrounds.

While all three were technically open to visitors, however, only two of these facilities were specifically designed to accommodate tourists. In contrast to the displays at the Electricity Building and the Machinery and Transportation Building, the facilities in the Service Building were systematically deemphasized in tourist pamphlets and guidebooks. In these materials, visitors were typically encouraged to observe the working models on display at the other two buildings, but the Service Building was rarely, if ever, mentioned. Furthermore, C.D. Arnold seems to have never published an official photograph of the building, indicating the lack of interest in the building amongst fair officials and subsequently, tourists. The architecture of the building itself seems to have been determinedly unremarkable, with none of the stylistic adornment, color or grand entrances that typified the other buildings on the fairgrounds. Describing this building only briefly in *Engineering Record*, one journalist stated, "The power plant at the northwest corner of the grounds, the combination service and exhibit plant, occupies a large frame and plainly temporary building, 170 x 200 feet in plan."[215] Inside this 'plainly temporary' building, the plan featured a longitudinal dividing wall that separated the boiler and engine rooms, with a "small room of brick with concrete arched ceiling, to have as high a degree of fire-resisting qualities as practicable."[216] Additionally, the rear of the building provided access to railroad tracks that could be used for receiving coal in order to generate steam power in case of an electric power failure.

For fair administrators, the utilitarian design of the Service Building was likely a conscious choice to deemphasize its presence on the grounds, attempting to render it relatively invisible instead. While the Pan-American Exposition was initially intended to operate fully on electric power, the large scale displays of exterior illumination and interior exhibits soon proved to require more power than anticipated. "At Buffalo, it was expected to have an exposition without the steam engine, to make the lighting effects and the power supply in themselves an exposition of the triumphant solution of the generation of electricity at Niagara and its transmission to Buffalo. No provision was therefore made in the original design for a steam power plant, or for the exhibition of steam and gas engines in operation."[217] Recognizing that more power would be required, the Service Building was constructed somewhat as an afterthought. In response to this unanticipated demand for power, the Service Building was designed to provide additional, steam-generated power that would augment the electricity on the grounds. As one journal indicated, "As the project grew, it became evident that the five thousand horse power contracted for from the Cataract Power Company [Niagara Falls Power Company] would not be sufficient for the needs of the exposition and a 'service plant' with a capacity of some 3,600 horse power constituted of such boilers and machinery as could be cheaply had for temporary use was erected."[218] Built as a compromise that acknowledged the limitations of electric power, the Service Building represented the reluctant incorporation of steam in order to power a fair that was designed to celebrate the triumph of electricity.

The presence of the longitudinal wall, brick fireproof room, and direct rail access provides clues as to the motivations behind deemphasizing the Service Building to tourists. The use of brick, rather than frame, clearly indicates the concern for inflammability that pervaded may aspects of the exposition and its prevalent use of electricity. Yet each of these architectural elements was directly related to generating steam power, rather than electric power, and therefore did not celebrate the full conversion to electric power that the fair was intended to exhibit. Twelve steam engines were placed in the building, driven by large belt shafts that would have been relatively noisy and full of motion in contrast to the sleek, silent turbines present in the other buildings' displays. The longitudinal wall divided the interior in order to separate the steam boiler room from the engine room, with "the boiler room occupying probably one-quarter of the space, and the engine room practically all the rest; the switchboard is on the opposite side of the room from the boilers."[219] This room division was common in many powerhouses at the time, which typically generated a combination of steam power and electric power in distinctive, fireproof rooms in order to minimize damage in the event of an explosion or extreme climatic change. In this sense, the Service Building was a "combination of a purely initial utility plant augmented by a large number of show steam and electric machines which have proven of considerable value, as the demands for power greatly exceed the first expectations."[220] When viewed in the context of the fair's theme of electricity, it is surprising that these 'show steam machines' were on display at all.

Although some guidebooks indicate that the Service Building was open to the public, it is unlikely that it attracted nearly as much interest as the two other exhibits in the Electricity Building and the Machinery and Transportation Building. The building is not included amongst the list of exhibits in the official catalogue of the fair. One article in an engineering journal did indicate that the building was technically open for visitors to enter should they choose, but warned readers that there was not sufficient floor space to move comfortably through the building.[221] The plain, unadorned exterior, perfunctory interior spaces crowded with loud equipment, and more traditional steam-powered boilers would have been unlikely to attract much attention from tourists at the fair, particularly when more innovative forms of electric power were on display elsewhere. Designed to hide in plain sight, the Service Building revealed as much in its absence from the central tourist circuit as other displays did in their prominent presence elsewhere on the fairgrounds.

In contrast to the perfunctory exhibits at the Service Building, the exhibits on display at the Machinery and Transportation Building were clearly designed to convey the triumph of electric power to tourists at the fair. Where the Service Building provided no tangible accommodations for visitors, the power plant at the Machinery and Transportation Building was eventually designed as a working model on display. Located in the center of the building, the power plant was "altogether an exhibition plant, occupying a central court several feet below the general floor-level in the Machinery and Transportation Building."[222] Placing the plant in a recessed area below ground level, the exhibit design echoed some of the tourist infrastructure that had already begun to appear in factories (Figure 29). Accessible by a stairway near the main entrance of the building, the gallery provided a "public gangway down the center" that was "about 100 x 200 feet in main dimensions."[223] This gallery, seen in Figure 30, formed an "elevated walkway" that functioned much like those at the Palace of Light and the Adams Powerhouse. Placing an observation gallery around the perimeter of the plant, the recessed exhibit was intended to be viewed from above, where "exposition visitors could peer down into the court to observe the engines in operation."[224] There, they could 'watch the wheels go round,' from the safe distance of the elevated walkway.

While the installation of an observation gallery was becoming a relatively common architectural response to tourism by this time, some exposition visitors were not pleased with the exhibition infrastructure at the Machinery and Transportation building. One engineering journal indicated that "some dissatisfaction was expressed at first on account of its isolation and inaccessibility."[225] In response to this type of complaint, additional walkways were added to the exhibit, along with an expanded amount of space for tourists on the preexisting gallery. In order to better accommodate tourists, designers raised the roof "to a height of eight or ten feet so that the passage around the court on the main floor level is virtually a gallery overlooking the engines and machinery, in addition to which cross galleries have been placed centrally over the court upon the same level."[226] An additional flight of stairs was added to provide access to the observation galleries, so that visitors could descend into the recessed engine room should they choose to do so. Each of these infrastructural adjustments attempted to provide visitors with a more customizable, interactive experience, wherein they could observe the machines from a variety of angles. Despite these additions, however, some reviews indicate that the central engine room remained foreboding without a guide. One remarked, “It is said that the exhibitors made a purse and bought a handsome present for a lady visitor who had the temerity to descend to the engine room.”[227] Encountering these nearly foreign machines with a mix of awe, mystery and even fear, some tourists traversed the observation gallery and engine room floor at the Machinery and Transportation Building with little knowledge of the power-generation processes they represented.

While the displays at the Service Building and the Machinery and Transportation Building exhibited the process of power-generation in operation, exhibits at the Electricity Building were equally as performative as they were practical. Immediately upon entering the building, visitors encountered the spectacular display of light, color and sound that the Westinghouse sign provided. Deeming this high-voltage sign as “one of the most novel attractions in the Electricity Building,” one visitor described the installation as follows:

> The sign consists of two large glass plates covered on the back with metal foil, with the name "Westinghouse" in the center...As the potential is raised a fringe of violet light appears about the letters, which, gradually increasing in intensity, culminates in a myriad-branched lightning discharge that plays continuously over the surface of the plate and is accompanied by a continuous noise not unlike thunder.[228]

Much like Edison’s Tower of Light at the Chicago Exposition, the Westinghouse sign used a combination of light, color and sound to instantaneously attract tourists to this electric display. With little educational value, the Westinghouse sign was designed primarily to attract, rather than instruct, viewers who made their way into the Electricity Building. Primarily a spectacle rather than an informational exhibit, the presence of Westinghouse sign was balanced by some of the more subtle, educational exhibits on display at the Electricity Building.

For those who wanted to learn more about the process of electric power generation and transmission, the Electricity Building featured a miniature power station in operation on the ground floor (Figure 31). In contrast to the presence of steam power at the Service Building, all of the exhibits in this building were "entirely electrical, utilizing high-tension current from Niagara."[229] Located in the northwestern corner of the building, the General Electric Company displayed a working plant in operation as it provided the electricity used to power the exterior illumination of the fairgrounds. Operated in conjunction with the Niagara Falls Power Company, the General Electric exhibit featured the machines and switchboards made by that company in order to generate and transmit electricity received from Niagara Falls. Functioning essentially as a miniature power station, the display was designed to exemplify, "the most modern method of generating and controlling alternating current, which is shown in practical operation."[230] Figure 31 illustrates a portion of this exhibit, which displayed the 5000 horsepower transformer plant and the switchboard used for distributing power throughout the grounds. The transformer plant was the dominant feature of this display, including the large transformers made by General Electric to distribute and convert electricity sent from the Adams Powerhouse at Niagara Falls. Seen in the central foreground of Figure 31, the transformers were large-scale machines that were taller than the average tourist, clustered together in a condensed mass of technology in the center of the floor. This group of transformers resembled what one tourist described as "practically a typical modern substation...which transforms all of the current used by the exposition company in the lighting scheme of the buildings and grounds."[231]

In addition to viewing the transformers up close, visitors could also witness the switchboard used to control them in operation. Figure 32 shows this switchboard in more detail, which was hand-operated by large switches that distributed, and reduced, the supply of current through lower-voltage feeder circuits to numerous transformer pits throughout the fairgrounds. Controlled by a human worker on display, the switchboard portion of this exhibit demonstrated the large scale of the machines and dwarfed the single human within their midst. Rather than viewing the worker from above as in an observation gallery, however, the General Electric exhibit enabled tourists to encounter the switchboard and switchboard operator on ground level.

Figure 31 also illustrates a number of elements that were installed in order to guide, control and shape tourist perceptions of electricity and the power generation process. As the image indicates, visitors encountered this display on ground level, rather than from an observation gallery at a distance. While these exhibits enabled tourists to view the switchboards and transformers at close range, they also utilized a number of devices to ensure that visitors would stay on a specific path. The presence of a carpeted walkway threaded throughout the exhibits indicates the location of this tourist path, which wove around each of the displays in a distinct, linear order. Unable to provide company-sponsored tour guides as at the Adams Powerhouse or the Larkin Company, this carpet performed a similar role in providing a set order of visitation points throughout the room. While some of the human figures in the photograph demonstrate that this path was not always followed precisely, the presence of the path likely provided some guidelines for tourists to organize their journey through the Electricity Building. Even if they physically strayed off the actual carpeted walkway, its presence likely influenced the general order in which they experienced the exhibits.

Furthermore, the placement of the carpeted path indicates the proximity that tourists were intended to get to each of the exhibits. In some instances, as seen towards the upper left corner of the image, the pathway served as a physical reminder to keep a safe distance from the machines in operation. Placed a few feet away from the machines under the General Electric Company sign, the pathway reminded tourists to observe that particular aspect of the exhibit without touching anything. The presence of a rope barrier with stanchions further reinforced these guidelines for tourists, dividing their space for observation from the space for machine operations. In other areas of the building, however, the walkway served the opposite purpose. Encouraging visitors to get closer to some of the devices, the carpeted path traversed through some exhibits at close range. Seen in the foreground of Figure 31, the path actually traveled through the large metal ring in order to invite visitors to walk into, stand within and even touch the ring on display. This tactile, interactive type of display was possible because the ring were merely a model rather than a working device, thereby presenting no danger to tourists. As part of the General Electric exhibit, this nickel and steel forged ring modeled the type that the General Electric Company produced for the Niagara Falls Power Company to use in their power generators at the Adams Powerhouse. Providing visitors with a sense of the size, scale and material of the ring as well as the larger devices it functioned amongst, the simple device of the carpeted pathway effectively guided the tourist experience through each exhibit.

Compared to the observation gallery at the Adams Powerhouse, the tourist infrastructure at the Pan-American Exposition enabled visitors to get much closer to the machines on display. Able to traverse through a Tesla ring, around a switchboard and even touch some of the machines at this miniature power station, visitors could engage with this electric equipment on a much more tactile, immediate level than they could from the raised galleries and carefully scripted tour path at the Adams Powerhouse. Conversely, visitors only encountered the appearance of a powerhouse at the Pan-American Exposition, where much of the equipment was not actually functioning or in operation. Although many of the displays in the Electricity Building and the Machinery Building emphasized that visitors could witness the equipment as it transmitted power throughout the fairgrounds, a closer look at the actual dispersion of power has revealed that much of the power generating and transmitting operations occurred away from sight in the Service Building. While these exhibits did incorporate some educational elements, most of them emphasized entertainment as their primary goal. This was motivated at least in part by the broad, diverse audience of tourists that made their way to the electrical exhibits at the Exposition, often with little to no prior knowledge of these technical processes. At the Adams Powerhouse, however, the audience was slightly more specialized, wherein engineers and other specialists visited the building in order to gain a better, more technical understanding of the topic. Attempting to satisfy these tourists as well as the more casual tourists who came to marvel at the source of the fair's power, the

Adams Powerhouse incorporated infrastructure that would accommodate visitors within the fully operational facility at a safe distance from the machines.

Offering different blends of educational and entertainment value, both of these tourist destinations used architectural elements to guide, shape and even control the tourist experience of electric power generation and transmission. Employing different but overlapping forms of tourist infrastructure, the Adams Powerhouse and the exhibits at the Pan American Exposition carefully constructed tourist views to shape their particular corporate agendas. Both of these destinations incorporated touristic elements that were specifically designed for the sole purpose of accommodating visitors, rather than serving a more practical, power-generating function. The elevated observation gallery served as a primary example of this at the Adams Powerhouse, designed as a permanent aspect of the building for a long-lasting tour program. At the Pan-American Exposition, carpeted pathways, electric installations and small exhibits were designed in a more temporary fashion, accommodating thousands of tourists over a short period of time and then disassembled at the end of the fair. Although both of these physical locations have since been demolished, the design of these infrastructural devices greatly impacted the tourist experience of these spaces. While these ephemeral tour experiences can be difficult for historians to assess today, the presence of this architourist infrastructure provides insight into the multiple ways in which designers directly shaped, guided and controlled the public understanding of both the electrical process and industrial architecture overall.

Using similar devices such as the observation gallery and precise pathway, both permanent industrial buildings such as the Adams Powerhouse and temporary industrial exhibits at world's fairs found ways to utilize architectural elements to shape and control the tourist impression of electricity. Once historians acknowledge the contemporaneous emergence of these tourist devices seen at both world's fairs and industrial buildings around the turn of the twentieth century, the question then becomes, where did this architourist infrastructure originate? Did the installation of permanent observation galleries in industrial buildings inspire their appearance in temporary exhibits at the world's fairs, or did it happen in reverse? More likely, the development of this infrastructure was mutual and interdependent, where designers mutated devices such as the observation gallery to suit their mutual needs in a unique space, whether it be a powerhouse or an exposition. In doing so, the lines between authentic and inauthentic, between education and entertainment, and between corporate transparency and consumer translation, were far more blurred than designers would have the viewers believe. Visitors who went to Niagara Falls could experience the Adams Powerhouse as a working factory on display, or they could experience what was essentially a museum exhibit of a factory at the Pan-American Exposition in Buffalo. In this way, architourist infrastructure became the lens through which visitors encountered different interpretations of 'industry' at the turn of the twentieth century.

[1] F.L. Koethen, "The Story of the Men Who Built the Electrochemical Industry with Niagara Power," (Presentation, Carborundum Company for the Electrochemical Society, New York, 1961), 4.
[2] Ginger Strand, *Inventing Niagara: Beauty, Power and Lies* (New York: Simon and Schuster, 2008), 162.
[3] For more on world's fair architecture, exhibits and photography, begin with works by Robert Rydell, James Gilbert, Neil Harris, and Peter Hales.
[4] Elbert Hubbard, *Power, or, The Story of Niagara* (East Aurora: The Roycrofters, 1914), 18.
[5] "Niagara Power," *Cassiers* (1895)*,* 224
[6] Other transmissions include June 3, 1889, from Wiliamette Falls to Portland Oregon, 14 miles, direct current, and others around the same time in Great Barrington, Massachusetts and Rome, Italy. There was also a demonstration of long distance alternating current transmission at the 1884 International Exhibition in Turin, Italy, but it was not a permanent operation.
[7] David Nye, *Electrifying America: Social Meanings of a New Technology, 1880-1940* (Cambridge, MA: MIT Press, 1990), 28.
[8] David Nye, *Consuming Power: A Social History of American Energies* (Cambridge, MA: MIT Press, 1999), 55.
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Figure 1. The Adams Powerhouse (Powerhouse Number One), completed 1895.
Courtesy of the Niagara Falls Public Library.

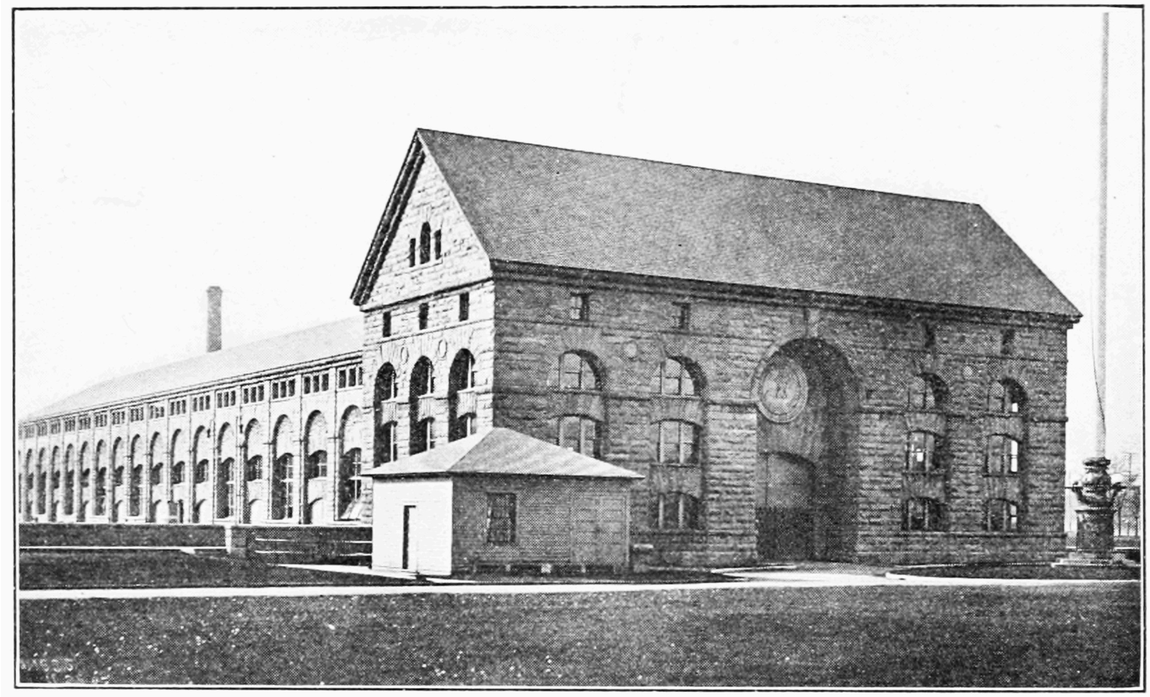


Figure 2. Schoellkopf Power Station Complex (Numbers One, Two and Three pictured), Niagara Falls, completed 1881. Courtesy of Niagara Falls Public Library.
Several of Schoellkopf's mills are visible on the right side of the image as well.

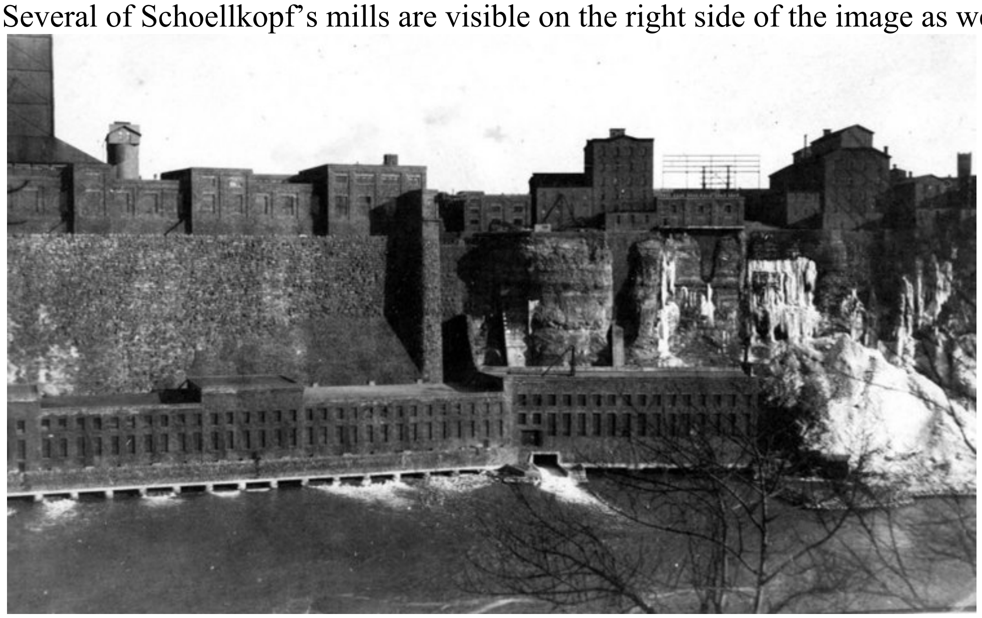


Figure 3. Thomas Evershed's Hydraulic Canal and Tunnel, c.1927.
Reproduced from Edward Dean Adams (1927) in Patrick McGreevy, "Imagining the Future at Niagara Falls" *Annals of the Association of American Geographers* 77. 1 (Mar., 1987).

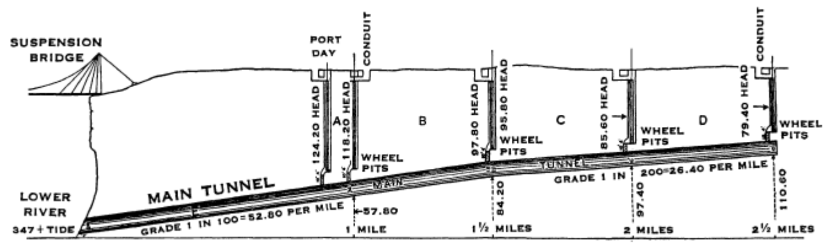


Figure 1. Power tunnel, cross-sectional view. From Adams 1927, 2:114.

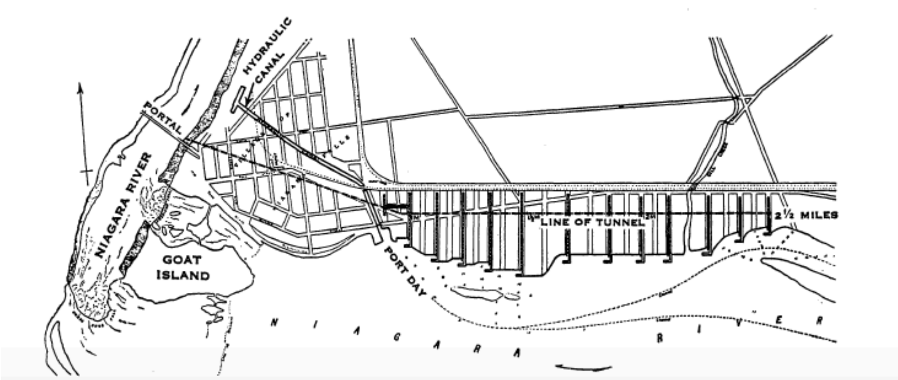
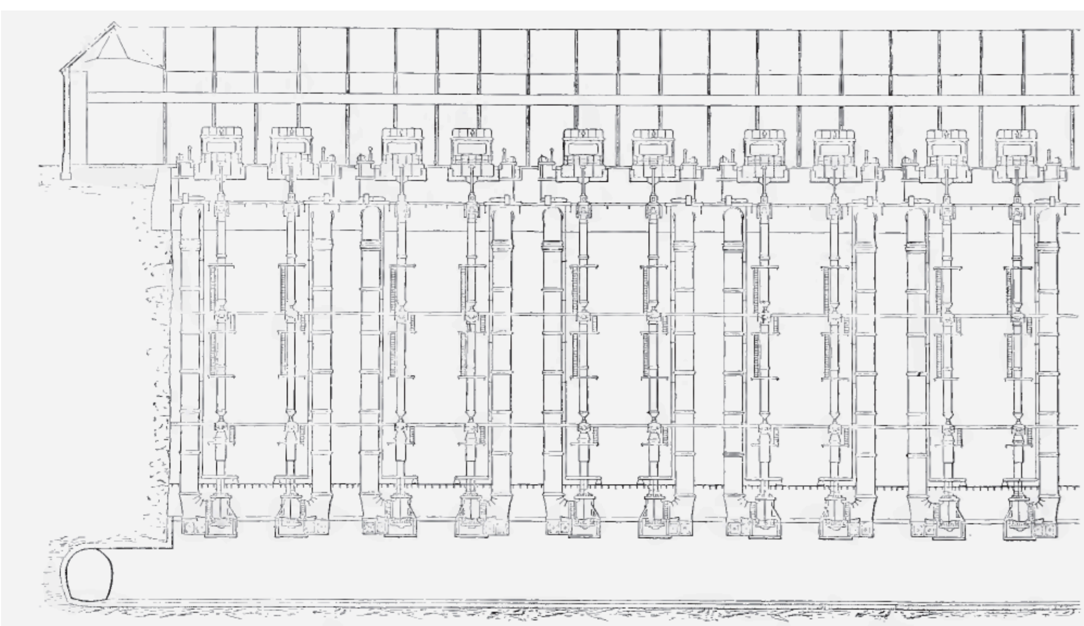


Figure 2. Map indicating location of power tunnel. From Adams 1927, 2:114.

Figure 4. Section of Wheel Pit at Adams Powerhouse.
Reproduced from "Niagara Power," *Cassiers Magazine*, 1895.



SECTIONAL ELEVATION OF THE POWER HOUSE AND WHEEL-PIT OF THE NIAGARA FALLS POWER COMPANY, TO CONTAIN TEN 5000 HORSE-POWER ELECTRIC GENERATORS AND TEN 5000 HORSE-POWER TURBINES.

Figure 5. The Niagara Falls Power Company industrial campus. The Adams Powerhouse (Number One) is located on the right of the image, the Transformer House is in the middle foreground, and Powerhouse Number Two is located to the left.
Courtesy of Niagara Falls Public Library.

Figure 6. The Adams Powerhouse, window detail. Completed 1895. Courtesy of Niagara Falls Public Library.

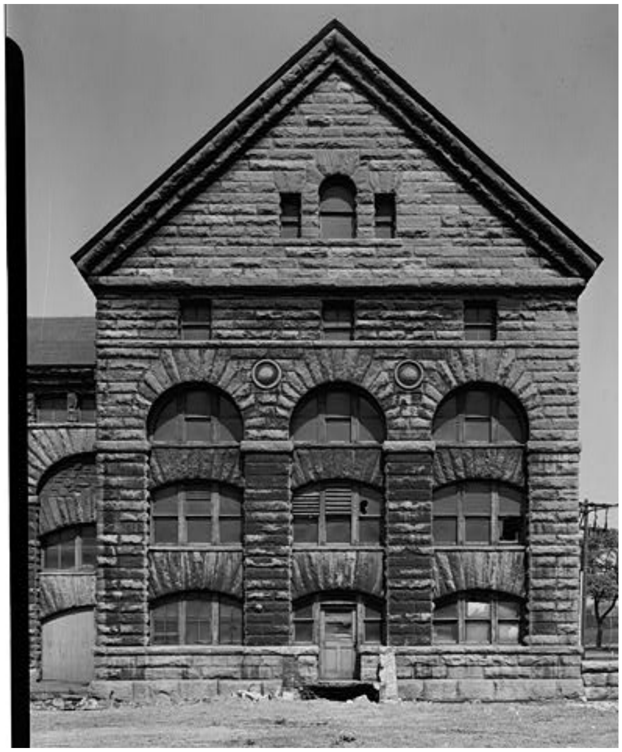


Figure 7. The Interborough Regional Transit (IRT) Powerhouse, completed 1904.

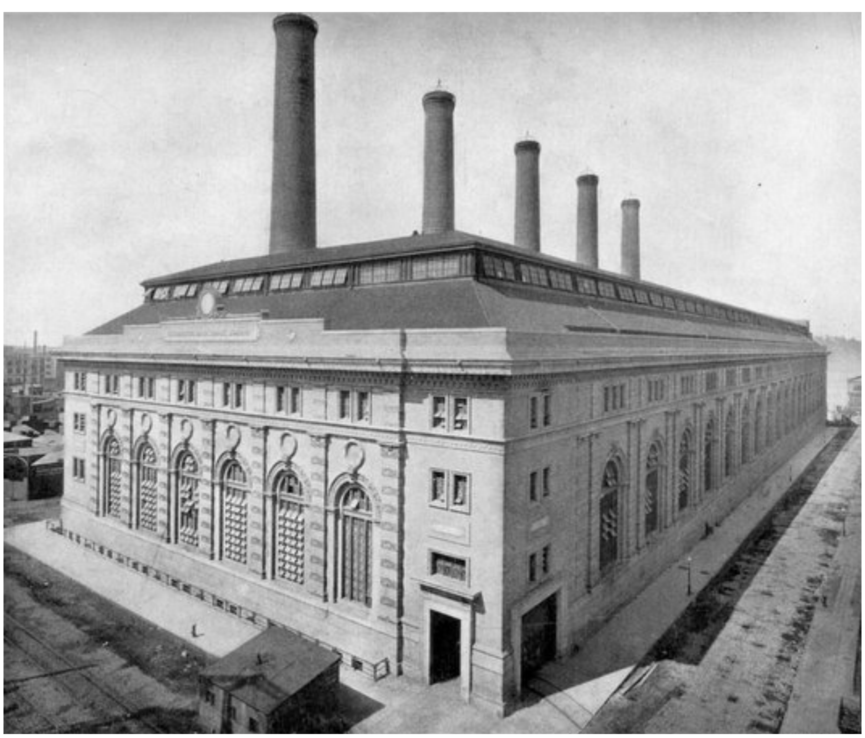


Figure 8. The NFPC Transformer House, note the windows, uninterrupted by stone supports. Constructed 1903. Courtesy of Niagara Falls Public Library.

Figure 9. The Schoellkopf Powerhouse, Buffalo. Completed 1917.

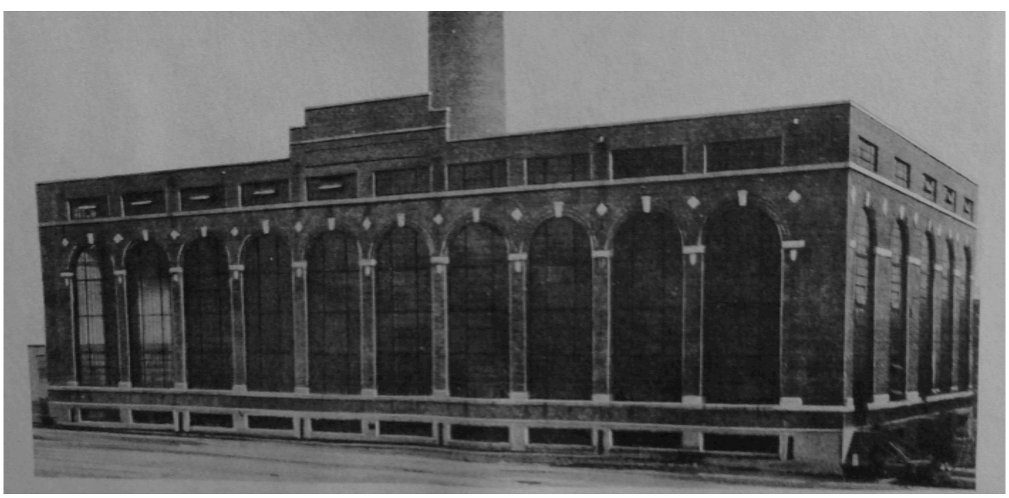


Figure 10. The Adams Powerhouse, interior view, c. 1901. Courtesy of Niagara Falls Public Library.

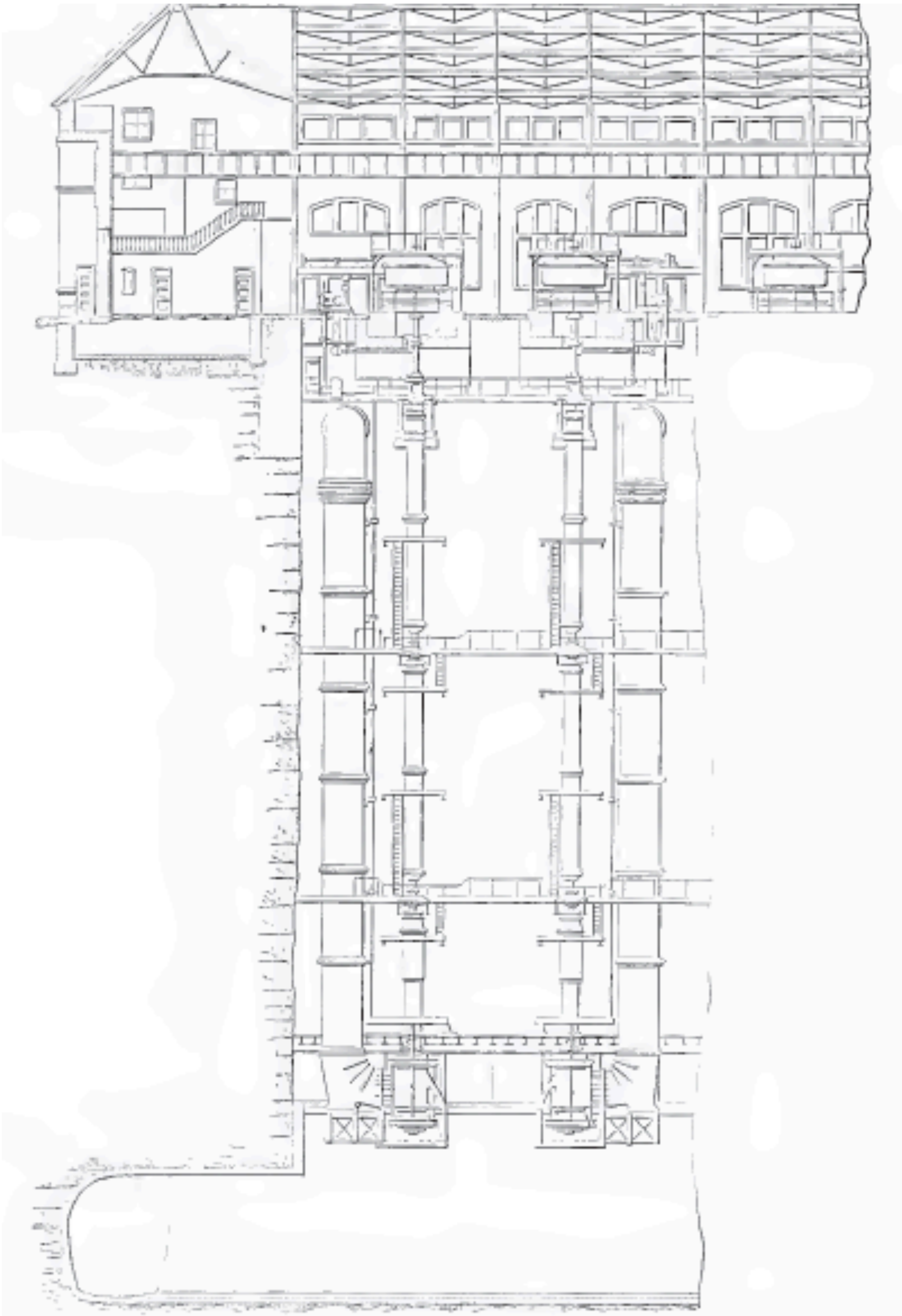
Figure 11. The Adams Powerhouse, interior view of switchboard operator (sitting). C. 1905. Courtesy of Niagara Falls Public Library.

Figure 12. Observation deck at the Palace of Light, c. 1930. Courtesy of Niagara Falls Public Library.

Figure 13. The Schoellkopf Power Station, Niagara Falls. Detail of outdoor walkway. Reproduced from Elbert Hubbard, *Power, or, The Story of Niagara*, East Aurora: The Roycrofters, 1914.

Promenade in Front of Power-Station No. 3

Figure 14. Partial longitudinal section of the wheel pit at the Adams Powerhouse. Reproduced from "Niagara Power," *Cassier's Magazine*, 1895.



PARTIAL LONGITUDINAL SECTION OF THE POWER HOUSE AND WHEELPIT.

Figure 15. Tourists at the Larkin Company, from *The Home of the Larkin Idea* (Buffalo, NY: Larkin Company, c.1908). Courtesy of Buffalo and Erie County Historical Society.

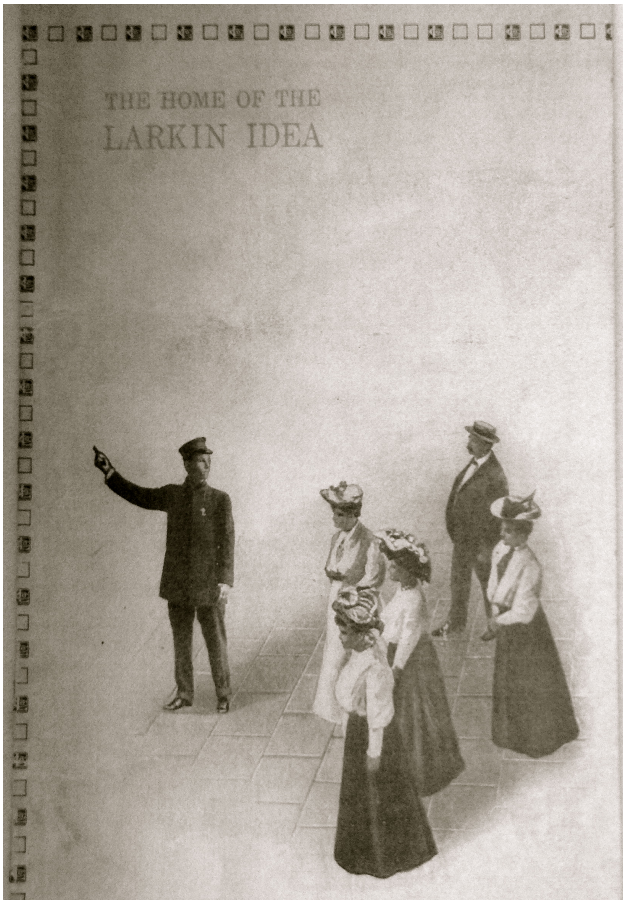


Figure 16. Power lines and pylon near the Schoellkopf Power Station in Niagara Falls. Reproduced from W.M. Read, "Photographic Album of Niagara Falls Hydroelectric Plant," 1924. Courtesy of Buffalo and Erie County Historical Society.

Figure 17. Cary, Evelyn Rumsey. *The Spirit of Niagara.* Promotional poster for the Pan American Exposition, 1901. Courtesy of the Buffalo and Erie County Historical Society.

Figure 18. Electricity Building, World's Columbian Exposition, Chicago, 1893.

Figure 19. Map of the Pan American Exposition, 1901. Courtesy of Buffalo and Erie County Historical Society.
The Electricity Building is located to the west of the Tower Basin and Court of Fountains, just north of the Machinery and Transportation Building. The Electric Tower is visible in the northern central portion of the map. The 'Power House' indicated in the northwest upper corner is the Service Building.

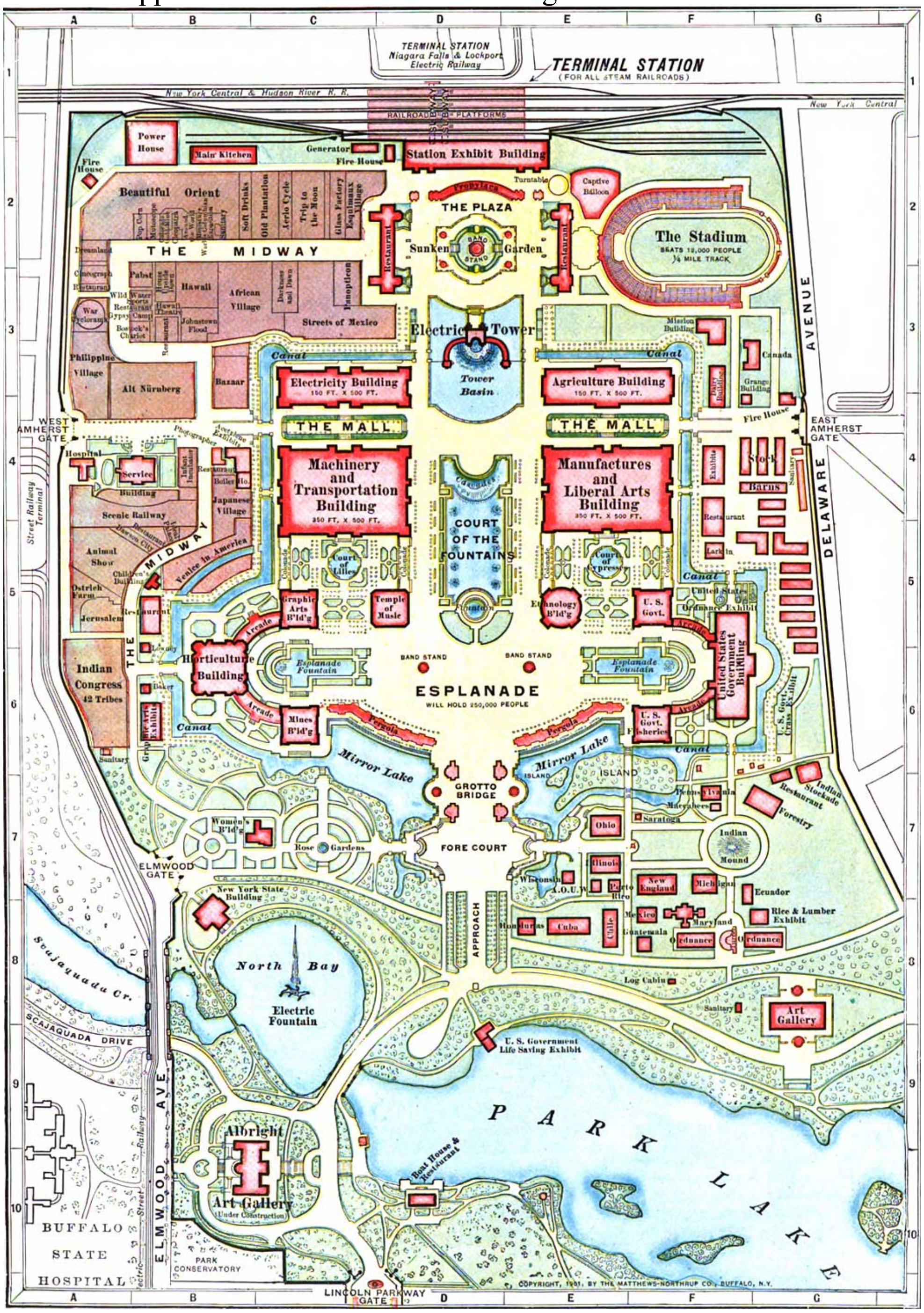


Figure 20. Electricity Building, Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

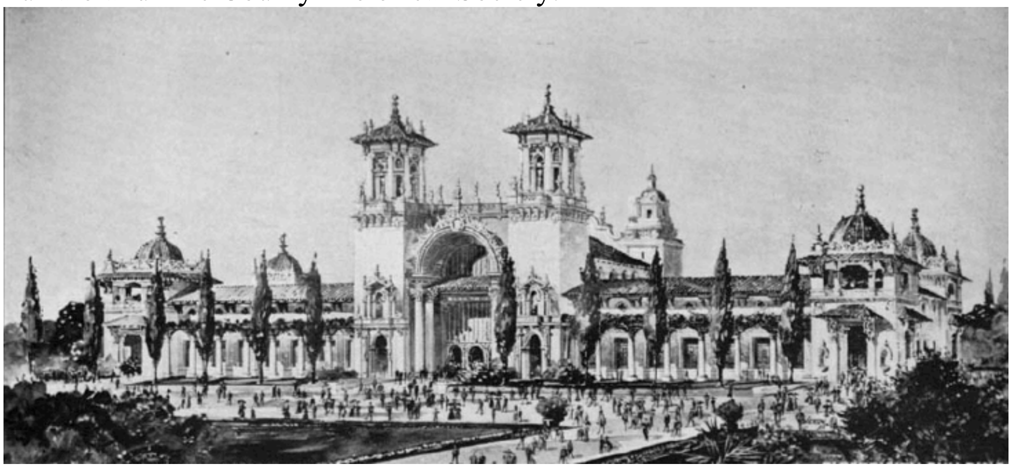


Figure 21. Electric Tower, Pan American Exposition. C.D. Arnold, 1901. Courtesy of Buffalo and Erie County Historical Society.

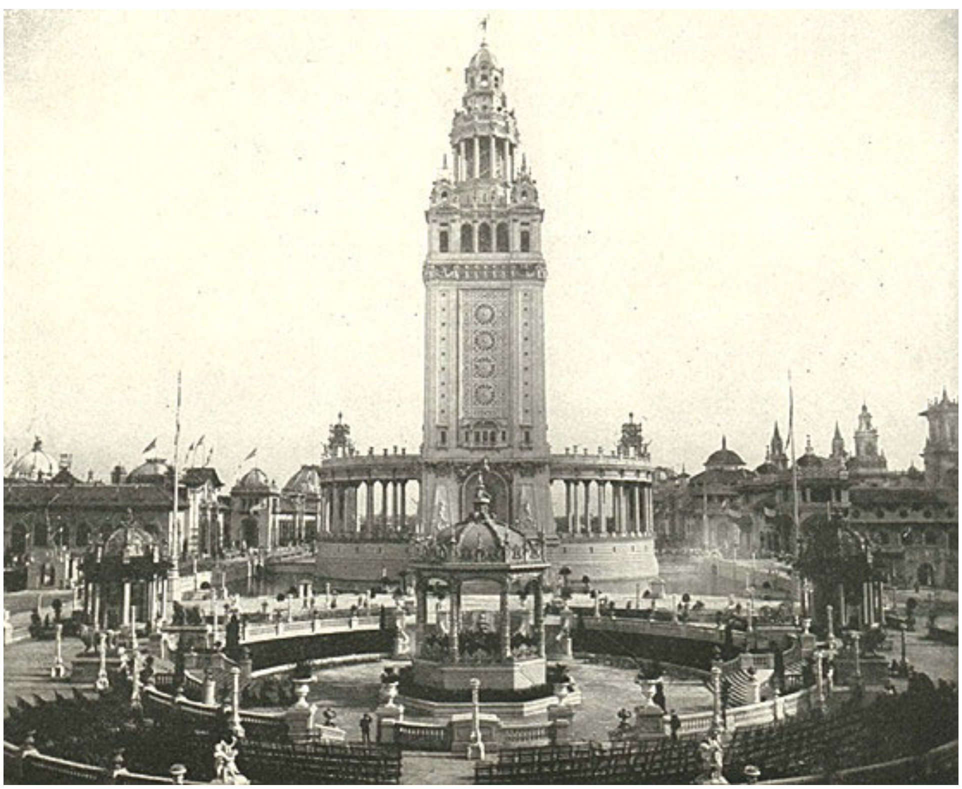


Figure 22. C.D. Arnold, "A Day View of the Cascade." Electric Tower, detail of water features. Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

Figure 23. Arnold, C.D. "Night View, Looking West towards Triumphal Bridge." Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

Figure 24. Arnold, C.D. “Triumphal Bridge Illuminated.” Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

Figure 25. Neurdien Brothers, “View of the Eiffel Tower and Exposition Universelle, Paris 1889,” Photograph album. Courtesy of Kroch Division of Rare and Manuscript Collections, Cornell University.

Figure 26. Todd, F. Dundas. Frontispiece in *World's Fair through a Camera: Snapshots by an Artist, Chicago World's Columbian Exposition, 1893*. Courtesy of Kroch Division of Rare and Manuscript Collections, Cornell University.

Figure 27. Electricity Building at World's Columbian Exposition, interior. Tower of Light visible in center. 1893.

Figure 28. General Electric Company, Bulb Exhibit. Electricity Building at Chicago World's Columbian Exposition, 1893.

Figure 29. Power Court Display at the Machinery Building, Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

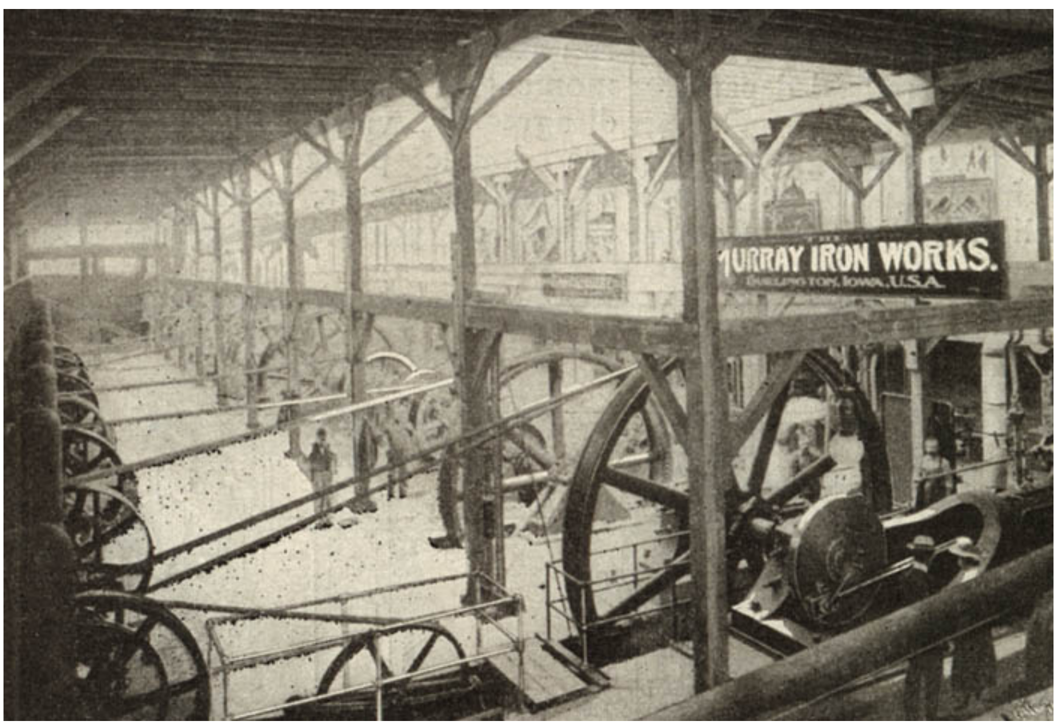


Figure 30. Observation Gallery at the Machinery Building, Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

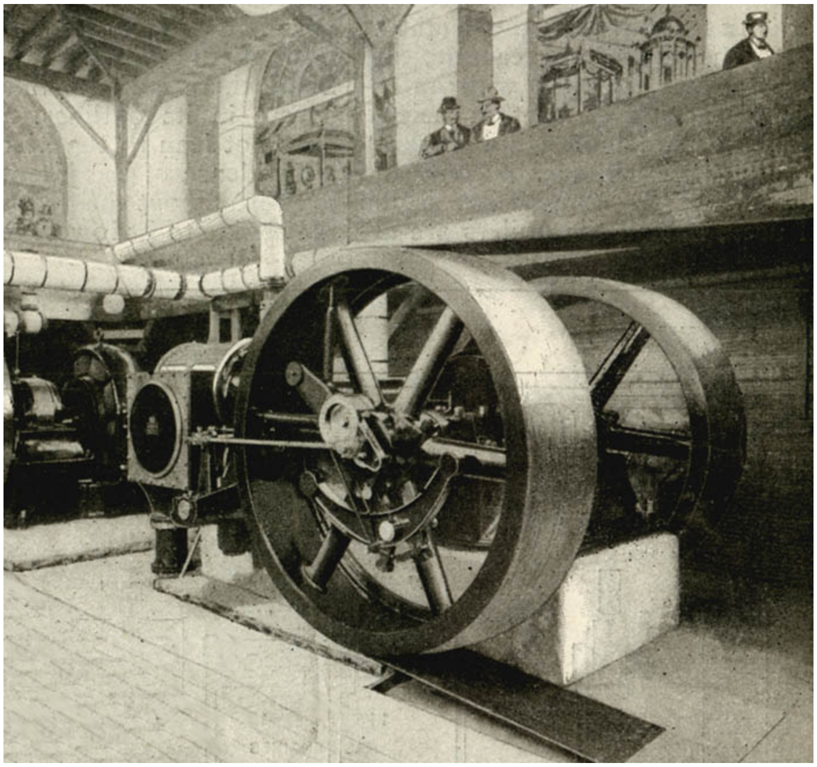


Figure 31. General Electric Company Exhibit, Electricity Building at the Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.

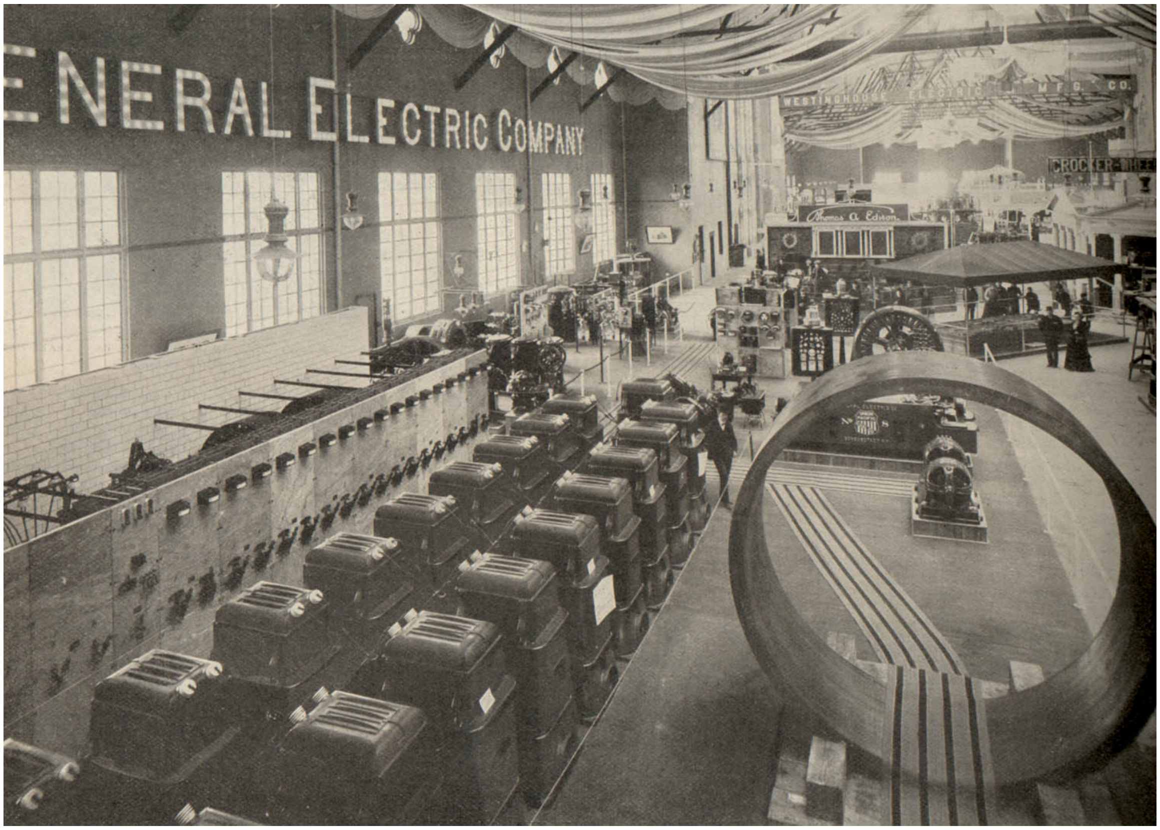
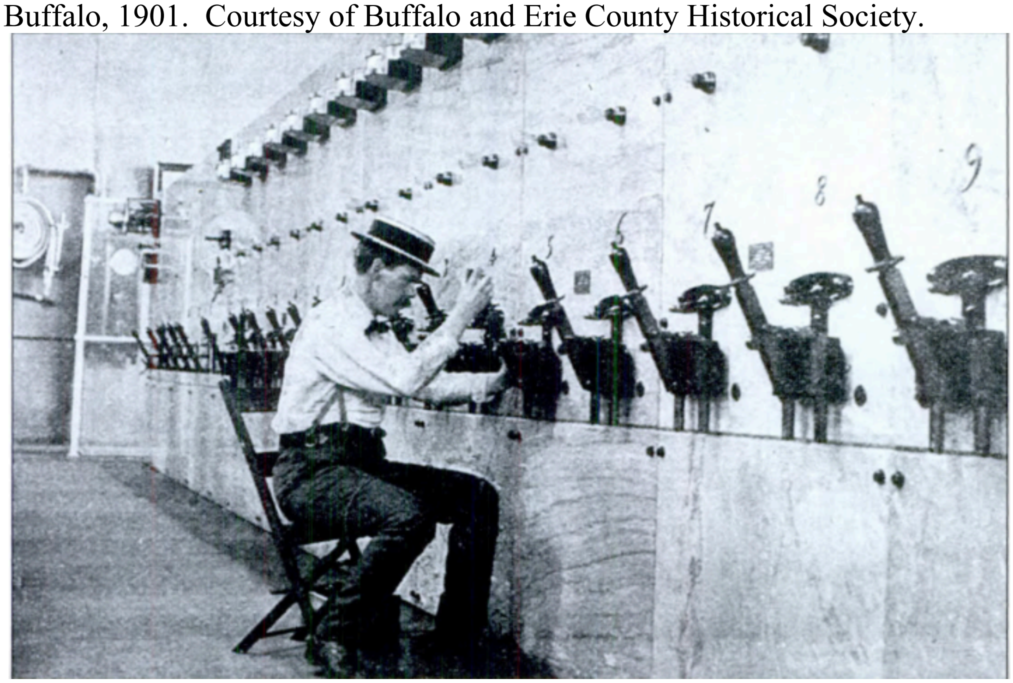


Figure 32. Switchboard Operator at the Electricity Building, Pan American Exposition, Buffalo, 1901. Courtesy of Buffalo and Erie County Historical Society.



Epilogue

Developing Decay:

From Ruin Porn to Revitalization

During the time it has taken to complete this dissertation, the buildings that form its focus have changed, much like the city of Buffalo itself. At the outset of this endeavor, I frequently found myself defending the city as my choice of subject for this dissertation. As a Rust Belt city that is typically discussed mostly in terms of snow, chicken wings and industrial job losses, my stubborn commitment to Buffalo and its industrial architecture has raised some eyebrows amongst colleagues and strangers from time to time. Now, however, I often find myself discussing my work to new groups of scholars, journalists and curious public citizens who have recently become more interested in Buffalo's architectural history as the city experiences what multiple newspapers have deemed, quite frankly, a "renaissance."[1]

Articles on the city's revitalization have appeared in the *New York Times*, *Washington Post,* and *The Guardian* as well as popular online venues such as *The Gothamist*, *The Huffington Post* and *The Daily Beast*.[2] The press has played a significant role in both recognizing and encouraging the repopulation of the city's neighborhoods, enough so that real estate values have risen approximately one hundred percent in the last five years in certain areas.[3] Attracted to the city's relatively low cost of living and abundant restaurants, art initiatives and growing job sector, stereotypical examples of Richard Florida's creative class have been making their way to Buffalo from places like New York City, Boston and even San Francisco. For those that have resiliently resided in the city for decades prior to this revitalization, however, the effects of this gentrification have been manifold. The story is the same as in many other cities: when minorities and underrepresented communities can no longer afford the cost of living, they are forced to move away from their communities to other areas, only in the fear of being displaced from there as well. While Buffalo is still far under the average cost of living in America, the rise in housing prices has happened faster than the rise in job opportunities or average salaries. When *Travel and Leisure* identifies Buffalo as "the nation's most underrated city," some worry that the city may become too highly rated for its own benefit.[4] Despite the city's newly established status as one of the "top places to relocate to in America,"[5] Buffalo still has yet to be taken as seriously as places like New York, Chicago, or even Detroit in academic realms. If the change in interest I have personally experienced from strangers is any indication, however, I have little doubt that scholarly attention to Buffalo will soon emerge in greater numbers.

Architectural heritage has become a cornerstone of the city's attempts to rebrand itself as both a tourist destination and a desirable place to live. The popular press has begun taking note of this, evident in the latest example: *Travel and Leisure* ranked Buffalo as the number one destination for architecture in the United States in March 2017. Citing the presence of buildings designed by the renowned triumvirate of Frank Lloyd Wright, H.H. Richardson and Louis Sullivan as many textbooks have done, rankings like this one perpetuate the prominence of the city's historic commercial, institutional and residential architecture while simultaneously neglecting the presence of groundbreaking industrial structures from the same era. As this dissertation has demonstrated, Buffalo's grain elevators, factories and powerhouses were far more integral to both the local and global history of architecture than is typically recognized. City boosters, developers and planners are right to identify historic architecture as a key component to urban revitalization, as the Buffalo-Niagara region boasts an incredibly rich, multifaceted architectural heritage. Yet, as interest mounts and money continues to flow in for new programming, it is vital that multiple types of architecture are included in this narrative as it continues to develop. Certainly there is room for not only the pre-established examples from the triumvirate of canonical architects, but also for the industrial buildings, engineers and laborers that raised this city from a small trading outpost to an international competitor in grain, steel and electric power. Today, these rundown factories are admittedly shabbier now, but as this dissertation has shown, they are equally impressive in their own way when viewed through the right lens.

This is not to say that Buffalo's industrial structures have been left out of the city's revitalization. Quite to the contrary, the grain elevators, factories and powerhouses that are the subject of this dissertation are quickly becoming the epicenter of these efforts to rebrand Buffalo with a sense of Rust Belt pride. When I began my research, most of these grain elevators were still vacant, ruined buildings that I could gain access to simply by trespassing. Now, these buildings are no longer vacant, but still ruined, and are constantly booked with events like architectural tours, art installations, theatrical performances, weddings, concerts, and beer tastings. Local companies such as Explore Buffalo and Buffalo River History Works offer a variety of tours through a complex of four grain elevators now called Silo City.[6] Privately owned, Silo City has been host to several events and projects- including craft beer festivals, concerts, art installations, poetry readings and a rock climbing gym (Figure 1). Putting forth narratives of revitalization, these architectural tours take visitors through the empty grain elevators as part of an attempt to reclaim the city's waterfront amidst its recent improvements. A few blocks away, the recently opened Riverworks complex features a 5,000-person venue for events, including an outdoor ice rink, roller derby rink, and restaurant overlooking the

Buffalo River with multiple grain elevators. In the shadow of the grain elevator located next door, which has been painted to resemble a Labatt Blue six-pack of beer, the Riverworks complex is currently transforming a partially demolished elevator into an outdoor beer garden (Figure 2). Although the grain elevators are no longer functioning as industrial structures, they are increasingly used for a variety of creative endeavors that challenge the notion that these places are 'abandoned.'

Amidst these numerous examples of adaptive reuse, it is essential to recognize that some of these structures still operate as industrial buildings. While the majority of the region's grain elevators are vacant today, others resist this postindustrial classification in tangible ways. The Washburn-Crosby grain elevator complex that proved so fascinating for Gropius, Mendelsohn and Banham has been operated by the General Mills Company since 1928. Providing hundreds of industrial jobs in the community, the General Mills elevators are a source of pride for many Buffalonians, who can be seen wearing t-shirts that boast 'My city smells like cheerios' in support of these operations. A few blocks away, the Great Northern Elevator is now operated by ADM Milling, which produces corn syrup rather than bulk grain by using twentieth-century technology to suit twenty-first century markets.

Despite these exceptions, it is difficult to deny that traditional hard manufacturing has generally left Buffalo, and the American Rust Belt region, in large numbers since the 1970s. The loss of thousands of industrial jobs for both skilled and unskilled workers at the grain elevators, the Bethlehem Steel Plant, and the Trico Plant dealt a severe blow to the communities and buildings they left behind. These factories were once the embodiment of economic success, and now many of them lie abandoned, crumbling under the gravity of increasingly complex concerns about the region's future. But in their shadow, industry perseveres in other forms and locations. Digital industries are continuing to thrive in the Buffalo region, as are medical health technologies and the biosciences industry. The region's historical relationship to energy derived from natural resources also continues to evolve in this economy, as Elon Musk's Solar City complex is set to begin producing solar panels and solar technology in fall of 2017. Located along the Buffalo River near the Concrete Central grain elevator, the Solar City complex will offer at least 1500 jobs to the Buffalo region. Utilizing a former brownfield site to usher in the next wave of natural energy sources, the Solar City complex hopes to change the course of Buffalo's economy much as hydroelectric power generation did in the early twentieth century. In this context, it is clear that industry still thrives in the Buffalo region in both new and old ways; simultaneously, postindustrial structures continue to adapt to new functions.

Paradoxically, the American shift away from traditional forms of industrial production has led to an increasing public interest in understanding industrial architecture. Before this shift, smokestacks and factories seemed nearly invisible to both public and scholarly attention, easily ignored from a passing train en route to the more celebrated canonical monuments downtown. Now that the jobs have gone and the buildings are left behind, the city, and nation, is newly interested in industrial architecture as a canvas for re-examining recent history. Although once invisible, these industrial structures are now becoming, quite frankly, trendy.

This raises concerns that the manufacturing industries will be replaced by the less tangible, but equally potent, industry of tourism. In Rust Belt cities like Buffalo and

Detroit, ruin tourism has created a magnetic attraction to these postindustrial spaces, serving as both an obstacle and an opportunity for revitalization. These 'ruin tours' typically take a group of people, usually a combination of amateur photographers and curious citizens, into abandoned industrial, residential or religious buildings that have been abandoned in order to explore their ruins, often illegally. These tours are as contentious as they are popular, and can have a major influence on the public perception of postindustrial buildings and landscapes. Given their subtle but powerful impact on the public understanding of these places, it is essential for scholars to ask, how much do these tours incorporate industrial architecture and its history? What narratives, if any, are being promoted by these kinds of tours, and what is being excluded? The growing interest in industrial sites creates a particularly charged context for architectural historians, who can be instrumental in shaping these narratives. This form of tourism, however, has also generated both impediments and inspiration for industrial heritage. As sociologist John Urry has suggested, "The development of an industrial museum in an old mill is a metonymic sign of the development of a post-industrial society."[7] In this sense, it may be the very same act of creating an industrial heritage that defines our own era as postindustrial. In doing so, some of these tourism efforts may inadvertently fix industry firmly in the past, not the present or future.

Buffalo's identity is still intimately linked with these industrial structures, but their role in the local economy, community and built environment has substantially changed. As a city, and citizenry, that is simultaneously proud of these industrial origins but also attempting to invite new types of industry into the area, these grain elevators and factories have become integral to this process of urban reinvention. This historically industrial architecture increasingly serves as the backdrop for negotiating the past, present and future identities of the city as it attempts to evolve in an arguably postindustrial era. In this context, Buffalo's industrial architectural history is becoming increasingly relevant in urban planning and historic preservation circles that attempt to guide this revitalization today. In both professional and academic realms, this history is vital to the future of Buffalo's development. Planners, preservationists and historians must grapple with ways to honor, acknowledge and incorporate a multifaceted approach to this industrial history while also enabling contemporary programs, business and events to reinterpret these spaces for postindustrial uses. Will these crumbling grain elevators and factories continue to be attractive only in decontextualized ruin, or is there some way to capitalize on the nearly universal aesthetic attraction to decay while also illuminating the sociocultural aspects of this architectural history? Now more than ever, it is essential that the history of this industrial architecture be integrated into future visions for the city.

Viewing Ruin Porn Photography

The increasingly popular postindustrial images of decaying industrial architecture have been promoted through two venues in particular: ruin porn photography and ruin tours. Much of the focus of this work has been centered around the American Rust Belt, where cities like Detroit, Cleveland, Pittsburgh and Buffalo have been featured in multiple images, articles and activities that emphasize the decaying industrial architecture in these places. While some feature abandoned schools, churches and residences as well, industrial architecture forms the primary subject matter of many ruin porn photographs, tours and discussions. Often viewing the decay of crumbling factories in the context of a postindustrial world, the aesthetic appeal of these industrial ruins forms the backdrop for broader considerations of the socioeconomic impact of an increasingly globalized, digitized world.

Spanning the high art and popular culture realms, ruin porn photography is often as defined by its highly aesthetic approach to industrial decay as it is by its relationship to consumerism. The curious term 'ruin porn' is as contentious as it is revealing. While the exact origin of the label is unconfirmed, its appearance in *Vice* magazine resulted in a growing usage of the term in both popular and academic discourse. In an online article on August 1, 2009, Thomas Morton quotes local photographer James Griffioen on his experience of other artists visiting Detroit. He states,

> At first, you're really flattered by it...But you get worn down trying to show them all the different sides of the city, then watching them go back and write the same story as everyone else. The photographers are the worst. Basically the only thing they're interested in shooting is ruin porn.[8]

The fact that this early usage of the term coincides with tension surrounding the relationship between Detroit locals and outside visitors is indicative of many larger issues that surround the genre. Since this appearance, the label 'ruin porn' has been applied to a growing number of photographs that portray abandoned industrial, commercial, religious and residential sites in a state of extreme decline. Ruin porn is visually compelling, and the highly aesthetic treatment of these spaces tends to fetishize the tactile detritus of urban decay. Photographers, viewers, urban explorers and tourists have demonstrated their magnetic attraction to these spaces, seeking out and promoting the strangely alluring qualities of these spaces while simultaneously silencing key voices and experiences surrounding these sites. Ruin porn photographs appear in a diversity of locations, ranging from museum exhibitions and coffee table books to social media sites and urban blogs. Professional photographers such as Andrew Moore, Camilo Vergara, Robert Polidori and the duo of Yves Marchand and Romain Meffre have produced some of the most renowned views of the urban ruins that plague shrinking cities from the Rust Belt to Russia. By generating this widespread appeal, ruin porn photographs illustrate the tremendous impact of visual representation on broader cultural perceptions of space, place and urban identities. In doing so, the genre has reintroduced a slew of problematic consequences and assumptions that can inspire some fundamental discourse about the impact of deindustrialization, class and racial tensions and national identity.

Although Buffalo's factories and grain elevators have been included in several ruin porn photography collections, the industrial architecture of Detroit has been exploited far more in this genre. Because Detroit has often been defined by the mono-economy of the automobile industry, it has become one of the most iconic places to explore the concept of a postindustrial America. Serving as a cautionary tale for future ruin-oriented developments in other Rust Belt cities, the city of Detroit has quickly become a hub for ruin porn photographers who are drawn to the easy national symbols found in abandoned automobile factories, empty skyscrapers and declining communities. Of course, Detroit's struggles are symptomatic of similar processes that have occurred around the nation, resonating perhaps most directly with Rust Belt cities like Cleveland, Pittsburgh, and Buffalo, but also occurring in their own manifestations in Los Angeles, Chicago and New York. Increasing discussions surround the deindustrialization of the nation, focusing on the outsourcing of jobs to international companies and locations, the impact of digitalization and the role of labor organizations in this process. Amongst this discourse, Detroit has become the imagined capital of this deindustrialized nation, serving as the symbolic ground on which a nation is coming to terms with its industrial past.

In this sense, photographing and viewing images of Detroit's demise can serve as part of an ongoing cultural process in redefining the American industrial past, present and future. These images envision the fall of America's industrial empire, firmly seated amidst the crumbling throne of the Rust Belt. By depicting the decay of these iconic factories, ruin porn capitalizes on the anxieties of a nation increasingly aware of its tendency towards waste, and of a new era in which its contributions to the global market are less tactile and shifting into new realms. These scenes are frequently viewed through an outsider's lens, often transforming the city into a screen for projecting broader cultural concerns, national insecurities and international debates. Museum exhibitions have garnered an international interest in the city and many of the most popular coffee table books have resulted from these exhibitions. In 2010, the *New York Times* named Andrew Moore's *Detroit Disassembled* book a top holiday gift of the year. Priced at $50 a copy, the book is likely out of reach for some of the Detroit residents living near the featured locations. This demonstrates that much of ruin porn's target audience, like the photography itself, is connected to the high art world, relatively privileged, and often geographically, economically and culturally distant from the realities of living in Detroit.

While no single image can represent an entire genre, Andrew Moore's "Rolling Hall, Ford Motor Company, River Rouge Complex" (Figure 3) has often served as the cover image for ruin porn, and is also the cover image for his popular book *Detroit Disassembled*. In this photograph, Moore uses a number of aesthetic techniques to emphasize the appeal of decay at the Ford Plant, an industrial icon of the Detroit region. The high color saturation applied to the image is typical of the genre, creating vivid, even unnatural colors that produce a rainbow of rust. The central linear perspective urges the viewer to wander down the seemingly endless hallway, providing a sense of scale that suggests just how vast the space is, in tandem with its emptiness. The absence of people is common in these architectural images, and the grandiosity of the space is contrasted by its silence, populated only by a few scattered objects. The obsolescence of the machines in the foreground is amplified by their dysfunctional positions, serving only as sculptures in an abandoned context. Broken windows, steel beams, and outmoded technologies are visual motifs here that repeat throughout many ruin images, illuminating the centrality of postindustrial emblems in many of these photographs. Rather than objectifying a body, ruin porn images fetishize economic disaster, translating a complex culpable history into an aesthetic curiosity that is visually captivating without context. Here, American decay, like pornography, is simultaneously aesthetic, distressing, and ultimately consumable.

Consumerism plays an important role in distributing these images, resulting in a growing array of commodities that feature similar subject matter. In addition to glossy books, magazines and prints, ruin porn has appeared on tote bags, coffee mugs, and t-shirts. Swatch has even produced a watch that is modeled after the so-called 'melting clock' in Cass Technical High School, featured in photographs by Moore, Marchand and Meffre and countless others. Here, Detroit's decay is no longer nuanced, but instead transformed into a capitalist product ready for consumer dollars. The presence and popularity of these items indicates that the term 'ruin porn' classifies not only a specific genre of photography, but expands to illustrate a growing cultural force that demands more careful consideration.

Far from the surreally beautiful presentation of these spaces in ruin porn photographs, however, are the causes and consequences of their abandonment. Removed from the historical, social, economic and political contexts of their neglect, ruin porn's vision of these industrial spaces tend to marginalize or silence a number of essential parties and perspectives. As John Patrick Leary reflected in *Guernica* magazine, ruin porn "aestheticizes poverty without questioning its origins."[9] The high visual appeal of ruin porn photographs indeed do much to amplify the attraction to this kind of decay, while simultaneously eliminating any signs of corporate blame, labor struggles or historical specificities to a given location. How might Moore's photograph of the River Rogue Complex appear to someone who lives across the street from the plant, or who was laid off by the plant? These images, like the space itself, likely evoke different associations for the plant's more immediate community. The absence of these human elements is troublesome, reflecting the common accusation that ruin porn is a relatively privileged leisure activity.

These issues, while seen more clearly in ruin porn, are also echoed in the historiography of industry and deindustrialization. As labor historians Jefferson Cowie and Joseph Heathcott boldly remind us, "In many respects, the idea that we live in a postindustrial age smacks of a certain northern intellectual conceit, and using 'postindustrial' to describe our current political economy and culture obscures more than it reveals."[10] In their book, fittingly titled *Beyond the Ruins*, they argue that "Indeed, the industrial age is alive and well, even if the locations have changed, and even if the rules of investment have shifted."[11] While the topic of North American deindustrialization often arises in ruin porn discourse, it is imperative that silent voices are heard as well.

Laborers and residents in these Detroit communities must be included in this discourse- even if they are not acknowledged in the photographs. In order for any analysis of ruin porn to move beyond the visible, or 'beyond the ruins,' it is essential to consider the notion of industry as having *shifted* to other regions and realms, rather than having magically disappeared. Therefore, when speaking of deindustrialization, I refer to the common perception of industrial loss, rather than to the multitude of complexities that comprise its transformations and departures.

The attraction to these spaces is not so easily confined to the high art realm, however, and its appearance in mainstream media, social networking websites and online blogs demonstrate the diverse influence of ruin porn. User-submitted content such as Instagram photographs, Twitter hashtags and Flicker albums provide a wealth of materials that simultaneously demonstrate the diversity of interest in ruin porn and the similarities of their aesthetic approaches to the subject matter. Produced by urban explorers and tourists, journalists and teenagers, many of these images are united in their use of photography to document their firsthand encounters with decaying spaces all over the globe. With aesthetic approaches that are reminiscent of Moore and Vergara, the wealth of images in this vast online community provides a valuable digital archive of the growing interest and evolution of ruin porn over the past decade.

The attraction to decay is rooted in a well-established history of ruin gazing that stretches back to antiquity, although is more commonly associated with the Romantic period. By the eighteenth century, the romantic adoration of ruins became feverish. Artists such as Giovanni Battista Piranesi popularized the genre in images of classical antiquity in ruins, and the romantic obsession with medieval rubble and gothic landscapes is well documented in artworks by Caspar David Friedrich and J.M.W. Turner. The fascination for decay can even be seen in the construction of artificial ruins for wealthy gardens and parks, forming a tradition that still persists today.[12] Looking back to the classical and medieval past was an honored pastime for centuries, and it continues today in different form. When photographing the ruins of Detroit in 1995, renowned artist Camilo Vergara boldly published what he called an “immodest proposal” in *Metropolis* magazine. Rather than advocating for large scale rehabilitations of the largely vacant downtown, Vergara suggested that twelve city blocks should be left standing as a “skyscraper ruins park,” affixing Detroit as an “American Acropolis.”[13] With a population of roughly one million at the time, this proposal was received with understandable resistance and hostility by many Detroit residents. When noting that it was conceived, however, as a “tonic for the imagination,”[14] Vergara’s vision of an ‘American Acropolis’ illuminates the pervasive influence of antiquity in the continual re-imagination of ruins.

Beginning in the late nineteenth century and continuing into the twentieth, the impact of the industrial era produced a shift in the depiction of ruins. As a way to digest the chaos of rapid construction and creative destruction that accompanied urban growth, there emerged a variety of images that contemplated modern cities in imaginary ruin. In John Ames Mitchell’s futuristic novel *The Last American*, the artist envisions the Brooklyn Bridge in ruins (Figure 4), only a few years after its completion. In his volume *Untimely Ruins*, American Studies scholar Nick Yablon demonstrates that this tendency has not emerged recently, and that post-apocalyptic fantasies have always revealed more about the present than about the past or future. As Yablon states, early twentieth-century American ruin visions, “rarely imagined the sacred vestiges of its cathedrals or the official relics of its City Halls, but rather the profane temples of its commercial-industrial everyday: ...factories, power plants, [and] railroad stations.”[15] Although the romantic imagination projected their anxieties onto the ruined corpses of classical and medieval architecture, today similar notions are envisioned through the ruined corpses of industrial architecture in ruin porn photographer. The act of projection is the same, but the canvas is different.

Today's ruin porn imagery emerges from this tradition, but now features different anxieties and different architecture. These images operate in a modern, or even postmodern, context rather than a pre-modern one, and thus their approaches are largely shaped by a contemporary perspective with its own set of associations. Certainly, some aesthetic qualities of ruin porn photographs do evoke the images of classical ruins that were prevalent into the nineteenth century, even using some of the same visual tactics at times. Like centuries of ruin images before them, these modern scenes depict the same cyclical view of history, the fear and awe of empires that rise and then fall, only to make way for a new empire to rise and fall again. The underlying motivations for depicting architecture in ruins may have changed little from antiquity until today, but the physical spaces and socioeconomic contexts for these ruins have changed alongside cultural shifts.

Just as there is a long history of ruin gazing, the practice of 'industry gazing' is also rooted in a longer tradition. The evolution of cultural perceptions of industry can be traced through over a century of images, ranging from sublime visions of late-nineteenth-century factories and machinery to more contemporary gothic depictions of their demise. As David Nye has illustrated, a widespread reverence for the technological sublime was intertwined with the power, terror and beauty of mechanical equipment and processes.[16] In this dissertation alone, this phenomenon has appeared in early twentieth-century examples of industrial images that includes photographs from a broad range of architects, and artists: Walter Gropius, Erich Mendelsohn, Charles Sheeler, and Charles Demuth, to name just a few. Emerging nearly simultaneously, Precisionist representations of industrial architecture such as Demuth's *My Egypt* echoed a larger cultural phenomenon that views industrial structures as the American versions of the great Egyptian pyramids, serving as the new national icons of architecture. While this industrial fascination is nearly synonymous with the modern age, it has often been expressed or portrayed through an association with antiquity. Gropius echoed this association in his highly influential article in *Jarhbuch des Deutschen Werkbundes*, stating "The compelling monumentality of the grain elevators...can almost bear comparison with the work of the ancient Egyptians in their overwhelming monumental power."[17] Years later, looking at some of the same industrial structures, architectural historian and critic Reyner Banham drew parallels to ancient Rome as well as Egypt. Viewing the grain elevators in Buffalo, NY, in various states of decay, he wrote that they "put one in mind of Ancient Rome: the catacombs most obviously, though the spatial complexities here might stir echoes of Hadrian's Villa or even the Domus Aurea of the emperor Nero."[18] Comparisons to Rome and Egypt span the twentieth and twenty-first centuries, with industrial architecture inspiring these parallels in both its working and ruined states. While the landscapes of these gazes may greatly differ, those differences can reveal some aspects of cultural and historical specificity amongst the common thread of this lengthy tradition. Today, many ruin porn images feature temples of industry rather than of antiquity, but the aesthetic attraction to decay has remained the same.

Linked with the consumption of ruin images is an increasingly popular interest in exploring the abandoned industrial spaces featured in many of these photographs. These decaying industrial spaces have proven to be magnetic for photographers and visitors alike, who are drawn to the sense of abandoned, wild settings that are amplified through ruin porn aesthetics. Groups of ruin tourists have flocked to Detroit, producing photographic evidence of their travels on both informal and guided tours. This has catalyzed a significant moment for the tourist industry that could either enrich or oversimplify the value of these spaces. By merging tourism with urban history and politics, ruin porn has generated fundamental discussions across disciplines and audiences regarding the national past and future of industrial production in an arguably postindustrial era. Of course, these ruin tours do not exist in a vacuum, and instead possess a multidirectional relationship with ruin porn photography, each medium influencing the other. In a world where tourist activity is almost universally proven by taking and displaying a picture, the line between ruin tourists and photographers has blurred.

Touring Industrial Ruins

Detroit's ruin tours provide a clear example of the complications that can arise when depicting newly postindustrial landscapes. Local resident Jesse Welter offers one such tour of Detroit, which has attracted international attention in the British *Daily Mail*, the *LA Times*, and the *New York Times*. In the past four years he has guided over 1,200 visitors through abandoned sites in Detroit, including boarded up high schools, decaying churches, and former automobile plants. Visiting these places is technically illegal and often dangerous, depending on the condition of the building or who else may be inside. Although Welter insists "there's safety in numbers," each person on the tour still signs a waiver agreeing not to sue in the event of any injury or death.[19] He states that he has provided the tour for "mostly internationals, a lot from Europe- I almost never have a local, at least not from the city proper."[20] Priced at $150 a person for a day of touring, this predominantly outsider tourist base is relatively unsurprising. Welter has taken hundreds visitors from the Detroit suburbs or as far away as Greece into his favorite locations for shooting ruin images. Organized as a photography workshop, Welter's tour visits many of the same sites made recognizable by Moore, engaging in what Dean MacCannell would identify as a 'marker' for site recognition.[21]

When I took one of these tours last fall, a hobbyist photographer from Norway was the most enthusiastic member of our odd little tourist circus. Armed with a heavy tripod and a serious camera, the Norwegian investment banker would set up in the rubble of the Packard Plant and take long exposures of crumbling concrete for hours, with one foot in asbestos and the other in a puddle of who knows what (Figure 5). His teenage daughter, taking only quick snapshots on her iPhone, was constantly annoyed with him for delaying the group at each place. When I asked him why he was so fascinated with this place, he told me, "In Norway, we do not have abandonment, things are good. Here I can see something entirely different from home. I feel like I get a sense of the real America here." He added, "It's beautiful."[22]

Examining some of the motivations for taking these kinds of industrial ruin tours may help to improve heritage sites in the future. MacCannell introduced the term 'negative sightseeing' in his seminal book *The Tourist,* where he described a practice that is somewhat akin to these industrial ruin tours. He envisioned negative sightseeing as a balancing force to the admiration that is expressed while visiting finer attractions like monuments, wherein viewing more decrepit sites "provides a moral stability to the modern touristic consciousness that extends...to the structure and organization of total society."[23] There are certainly elements of voyeuristic shame, guilt and remorse that come into play at these sites, but their interpretive potential extends beyond merely an abstract moral equilibrium between success and failure. Instead, they could be utilized to nuance the complex history of capitalism, of industrial development, and global economics. Historians must strive to incorporate a more detailed narrative into this industrial heritage, and tourism could provide an excellent vehicle for doing so.

Unfortunately, most of these tours fail to include any historical context. The narrative provided on these tours is that Detroit's industrial architecture is predominantly one of ruin, rather than revitalization. The places are seen as finished, their stories done. They take on new functions, serving as abstract artworks. At the Packard Plant, we were directed to take photographs of the colorful reflections of graffiti in puddles, with no mention of the historical, industrial or structural significance of the place. Albert Kahn's name was not mentioned, nor was the Model T. The seductive qualities of ruin porn have given new life to these spaces as artworks, but it is time to communicate far more about these spaces than their aesthetic ruin. The focus on physical and visual aspects has missed an important opportunity for content in this type of Detroit tour.

Still, some of the Norwegian tourist's words ring true, and these places are indeed undeniably beautiful. Welter's tour presented a highly sensory experience of industrial landscapes that echoes the sensory turn in historical scholarship. Tourists are encouraged to touch and listen to these spaces, to discover the layout of an unknown building by climbing around it, up to the top and through small holes in it. There is a physical engagement here that the public can have with industrial architecture that is not often present on, say, the formalized tours of the Pantheon. Industrial ruin tours exemplify the potential of applying this sensory turn to tourism, much like the Adams Powerhouse tour that brought visitors to a dark, dank underground wheel pit. Yet while early twentieth century visitors braved the dark unknown on a guided tour with plenty of specially-designed infrastructure to ensure their safety, today visitors increasingly tour the ruins of industrial buildings with no signs to identify where the asbestos, unstable floors, or dangerous stairwell are located.

As cultural geographer Tim Edensor suggests, the lure of industrial decay is, for some, precisely intertwined with a desire to engage with disorder. Viewing industrial ruins as places of transgression, Edensor argues that these spaces enable a rare opportunity to engage with the built environment out of the largely conscripted patterns of everyday urban life. Rather than operating as policed, ordered and highly regulated spaces, industrial ruins can even serve as places of play where "new forms, orderings and aesthetics can emerge."[24] Urban explorers highly emphasize this notion of play in their exploration of industrial ruins. The ability to explore an environment without a set path, pattern or pre-established series of sights and markers, Edensor advocates, provides an important alternative to the otherwise orderly experience of urban life.

Although many kinds of contemporary ruins can offer this kind of experience, industrial ruins in particular touch on this contrast between regimentation and disorder. In the first half of the twentieth century, industrial spaces were characterized, even stereotyped, primarily for their highly ordered architecture and mechanical processes. Albert Kahn's Ford factories are known especially for their efficiency at regulating factory workers' bodies throughout the plant, minimizing their movements while maximizing the production of automobiles.[25] These structures and processes were once associated with a highly conscripted organization of space and equipment, amplifying the contrast between that historically ordered environment with its contemporary state as crumbling ruins. The ruin porn emphasis on industrial ruins, therefore, reflects Edensor's assertion that "the site has changed from an intensively managed stage to a disorganized stage."[26] This transformation is thus heightened in the presence of industrial spaces, more so than in commercial or residential ones, due to these greater contrasts between high efficiency and chaotic rubble.

The unstructured, adventurous aspects of these prohibited ruins have given rise to a guerilla type of tourist that has been increasingly frequenting these formerly industrial spaces in many Rust Belt cities. Groups of urban explorers, or unofficial ruin tourists, have flocked in particular to Detroit, producing photographic evidence of their travels as well as verbal accounts in articles, blog entries and online magazines. The term 'urban explorers' (UE) is generally credited to Jeff Chapman, aka 'Ninjalicious,' who applied the label in the mid 1990's to describe himself and a large group of likeminded citizens who associated with the UE movement.[27] With roughly 350 UE groups worldwide, the movement shares the common motto of 'leave only footprints and take only pictures,' valuing documentation and respect for the spaces rather than more obviously illegal activities such as defacement and destruction of property.[28] This activity frequently requires trespassing into the unknown and an element of danger, but as DetroitUrbex.com, the website for one of the largest UE groups in the city, "Discovering is half the fun."[29] With at least ten UE groups in Detroit as well as countless individuals, the narratives and images on their websites provide a wealth of information and insight into the perspectives, experiences and motivations for visiting these spaces in Detroit.

The use of the term 'urban explorers' evokes a particularly prickly comparison to the imperialist tendency to conquer the supposedly 'unknown' or tame wild settings. This mentality of discovering an unknown, abandoned place- even if it used to employ thousands- echoes a longstanding Western tradition of travel in which outside visitors 'enlighten' the natives, bringing with them modernity, technology and McDonalds. Photographs play a central role in this process, and scholars ranging from anthropologists Catherine Lutz and Jane Collins to public intellectual Susan Sontag have demonstrated this across disciplines.[30] Appealing perhaps to the darker side of Sontag's succinct statement "To collect photographs is to collect the world,"[31] Steven High somewhat mourns the role of photography in the context of urban exploration. He states, "At its worst, the search for abandoned mills and factories worthy of exploration is analogous to the sport of hunting- and the photographs are little more than pictorial trophies."[32] Although these photographs instead serve a multitude of functions, High touches on just one aspect of their role in the urban explorer community. In a world where tourist activity is almost universally proven by taking and displaying a picture, this use of industrial ruin imagery certainly blurs the lines between urban explorers and ruin porn photography.

This concept of the explorer is particularly problematic in light of the ruin porn tendency to decontextualize industrial spaces from their immediate surroundings, from their workers, and from their histories. After mining a selection of travel narratives and online discussions amongst urban explorers, High asserts,

> Despite their stated desire to record places before they vanish, urban explorers are more interested in aesthetics than history...We learn more about how these abandoned feelings make the narrators feel, than about their history and function.[33]

Ranging from high art exhibitions to flicker websites, ruin porn photographs are stereotypically characterized for their highly aesthetic, somewhat isolated accounts of formerly industrial spaces. It may be possible that these ruin porn patterns occur not only in photography, but also in visitor approaches to these spaces as well. High laments that urban explorers "say very little about the history, function, and physical layout of the mills being explored...They seem to have only a vague idea of what went on inside."[34] This is a complaint that is often voiced about ruin porn as well, and this parallel to urban exploration requires further exploration in order to consider the degrees to which they overlap.

Contrasting High's scholarship with the visual and textual components of many Detroit UE websites reveals a much more nuanced diversity of activities and aims, and it becomes increasingly difficult to pin down a photograph as part of the 'ruin porn' genre or more photojournalistic in nature. Documentation, preservation and education are frequently emphasized by Detroit UE groups, and many attempt to distinguish themselves from ruin porn photographers. DetroitUrbex.com states that its central aim is to "document a noteworthy location without breaking in, stealing things, or vandalizing the building."[35] Others push a more explicit preservation agenda that moves beyond photographic documentation, as David Kohrman of 'Forgotten Detroit' explicitly states, "I am a staunch preservationist. It is my opinion that they *must* be restored."[36] Although photography is the most common product or evidence of exploration, its incorporation into blogs, discussion boards and online UE forums varies widely. While some images are indeed presented as the 'trophies' that High laments, others are included as illustrations alongside a textual history, or even historic photographs.

DetroitUrbex.com utilizes a layout that organizes UE photos according to location, accompanying each set of images with a brief textual history of the building in question. This historical context can range from a few sentences to nearly 1,000 words, demonstrating a noteworthy effort in some cases to connect the present decay with past significance. Unlike High's classification of many UE groups, Detroit Urbex insists, "The goal of this website is not to aestheticize ruins, but to document them. That's why we focus on historic photos, facts, and narratives about these locations."[37] The extent to which this is accomplished is still negotiable, but the effort employed on this particular website demonstrates at least one example that somewhat counteracts High's assertion that the UE community is generally disinterested in historical context. Rather than viewing Detroit's urban explorers as either ruin porn photographers or altruistic documentarians, it is perhaps more useful to view this diversity amongst ruin enthusiasts as a warning against generalization and as a demonstration of interest amongst a varied community.

With such a growing interest in visiting these now iconic ruined industrial sites, the tourism industry faces a particularly charged context. Although many Detroit urban explorers cite the thrill of adventure and danger of the unknown, several UE groups have started to give 'official' tours of iconic abandoned sites such as the Packard Plant and Michigan Central Station, much like Welter's tour model. Lowell Boileau, founder of the popular virtual tour and discussion forum website *YesDetroit!,* commented on this phenomenon, stating, "Rome and Athens make billions from their ruins. No one should be surprised that entrepreneurs here [in Detroit] wouldn't try the same. The city and metro have tried to sweep our ruins under a carpet of denial and blame. Accept them, learn from them and deal with them."[38] These tours are just a few examples demonstrating the potential for economic development, while also raising questions regarding their impact on the surrounding communities that witness these buildings firsthand everyday. There is a particular danger in the power of the tourist industry to harvest profits from a comfortable distance, reducing the significance of these sites to only their sensational images rather than incorporating the perspectives of nearby residents and former laborers. As one blogger comments, "Telling that same old tired story about Detroit is actually a part of the tourism trade…they are all poised to move in and profit from bashing the city. Lots of money to be made very soon (gentrification already in full swing) by a lot of folk who are already worth millions and billions."[39] The opportunity to develop these locations as tourist sites is often coupled with the challenges and potential they possess to either greatly enrich the public history of these often-marginalized places or greatly reduce their significance to a one-dimensional caricature. The popularity of industrial ruins has been both catalyzed by and reflected in ruin porn photography and urban exploration, bringing with it a dangerous opportunity to use this attraction to either revitalize cities or create a regretful dependency on a single, albeit different, kind of industry instead.

It is easy to envision this touristification of ruins as a catastrophic 'disneyfication,' devastating the essentially independent and adventurous experiences of decay and instead transforming the spaces for corporate profit. Exploitation has often gone hand in hand with tourism, and ruin porn photography reminds us that the potential for these negative impacts is already close at hand. One UE blogger jokingly envisioned, "maybe a 'Packard Plant' theme park? You know with phony billowing smoke and sparks, like guys using cutting torches, and piped in sound effects? They could sell t-shirts that said 'Made in Packard Plant.'"[40] Without proper guidance, the tourist industry could inadvertently amplify the ruin porn approach, aestheticizing these spaces while neglecting to address their broader multifaceted social, political and historical contexts. Once places full of a rich stratigraphy of meanings, neglected factories would be transformed into one hit wonders sung to the profitable tune of nostalgic decay. Furthermore, by capitalizing on the allure of rubble, tourism sites would face the danger of permanently fixing these sites as ruins, rather than opening up potential for their revitalization or reuse. One of the greatest obstacles of formalizing the attraction of decay for tourists, therefore, is that it would require maintaining a level of ruin that may not enable any real possibility of restoration.

Obstacles and Opportunities

The irony of creating tourist infrastructure at a place that is attractive precisely for its disorderly, unscripted and even chaotic qualities would perhaps not be lost on Edensor. Describing industrial ruin exploration as "a kind of anti-tourism,"[41] Edensor taps into one of the primary dilemmas of formalizing any kind of tourist experience in these spaces. Aside from the significant difficulties faced in obtaining legal permits to develop this kind of infrastructure, to do so would likely eliminate some of the appeal of these spaces. No longer places of adventurous danger, play and transgression, these sites would lose some of their attraction and significance as alternative spaces for urban experience. Considering more practical matters, Edensor adds, "There are no obvious spectacles around which to organize a tour, or which fit into expectations about what will be gazed upon, and sights will often be indecipherable. There is nothing to buy and nothing conforms to the staged aesthetics of tourist space."[42] Many of the established, comfortable patterns of tourism- its infrastructure, routines and messages- would be out of place in an 'abandoned' industrial ruin converted into a tourist site, leaving the industry grasping at straws as to how to fit this experience into neat packaging.

While this may seem an obstacle to developing decay, it could also provide a useful framework for re-envisioning tourist encounters with these spaces and at large. Admittedly, amongst the realities of liability clauses, accessibility concerns and safety requirements, a tourist version of these spaces would never deliver the same tactility and transgressive awe that they do now. Alongside these losses, however, there may also be some significant gains. What if the tourist industry could illuminate the darker corners of these spaces, shedding light onto their neglected social, economic and political histories? Laborer perspectives, oral histories, soundscapes, digital tools and interactive, climbable sets could connect the tactile, exploratory nature of today's decay with the grandeur of a booming history and its subsequent corporate downfall. While it may reduce the opportunity for transgressive, subcultural encounters with the ruins, tourism in this instance could educate and diversify the rich wealth of associations that these buildings could provide. The difficulty in doing so, however, lies in interpretation techniques and audience interactions.

In order to utilize tourism as a path to revitalization, we may have to redefine the role of a tourist and reconsider their path through the city. Just as urban spaces evolve, in this case from places of production to places of decay, so too should the guidebooks that accompany them. Architectural historian Andrew Herscher offers one example of this in his book *The Unreal Estate Guide to Detroit*, which blurs the boundaries between academic scholarship, professional recommendations and urban activism. Organized as a pocket-sized guide, with glossy full-page photos and orientating text, the layout brings to the surface the already porous boundary between urban history and urban guidebooks. As this dissertation has often utilized tourist guidebooks as informative, multifaceted historical documents, the notion of re-envisioning those historical guidebooks in a new format for the present day is particularly compelling. Merging historical scholarship, contemporary appropriations of place and architourist methods, the guidebook is an often overlooked medium that has the potential to incorporate architectural history into a modern exploration of these places in new ways.

Through this alternative guidebook format, Herscher demonstrates new methods of thinking about the future of a city in relationship to its past. With the hope that this guide, "might partially fill in what is often regarded as empty and abandoned space," Herscher has created "a picture of Detroit that is in contrast to the picture offered by projects that seek to visually document Detroit's decline."[43] By providing a 'tour' through the city that features not abandonment, but the occupation of ruined spaces, empty parking lots, vacant fields and dilapidated housing, Herscher envisions a Detroit that is fundamentally different from ruin porn, even though many of the locations are the same. As a direct response to *The Ruins of Detroit*, created by the famous European ruin porn photographers Yves Marchand and Romain Meffre, Herscher created this alternative vision of Detroit, "against the counter-spectacle of a city of ruins...this guide offers a view of a different city, suffused with potential instead of oblivion."[44] His section on 'ruin harvests,' an evocative label that speaks of fruitful bounty and growth, perceives of abandoned structures not as "distressing eyesores or entrancing spectacles," but rather "simply as material, able to accommodate new uses...something that contributes to or detracts from the common good."[45] This readily relates to the implementation of tourism around these sites, which could either develop decay into something culturally productive or detract from the value and rich meanings of the city. In order to capitalize on the widespread attraction to these industrial spaces, city planners, tourism officials, urban activists and historians alike must envision new ways to guide visitors and residents through the many significant properties of these places. Whatever forms this may take, it is sure to "require an approach to the shrinking city not so much as a problem to solve than as a prompt to new understandings of the city's spatial and cultural possibilities."[46] Viewing the subjects of ruin porn not as obstacles, but as opportunities, may enable creative approaches that intertwine tourism with education, and contextual understanding with innovative artwork.

In many ways, ruin porn photography illuminates the sheer power of visual representation, a theme that has been present throughout this entire dissertation. It demonstrates a troublesome side of images, one that has reduced a complex, multifaceted set of issues into a singular, oversimplified brand for consumption. On the other hand, ruin porn has amplified the potential to use these visual powers for good and demonstrated the beauty in what has often been viewed as decrepit. In order to use this attention for positive applications, however, the discourse about both ruin porn photography and industrial history must move beyond merely aesthetic concerns. While aesthetics are certainly central in any visual or architectural analysis, ruin porn photographs need to be considered in a variety of contexts- contexts that may have been left out of the images themselves. As this dissertation has demonstrated in multiple contexts, architectural images play a powerful role in shaping the public perception of technologically complex industrial spaces. Located just outside the frame of these images, the realities of labor relations, the shunned responsibilities of corporations, and the histories of social and architectural developments all play a role in the interpretation of these spaces. From their initial construction to today's ruins, each of these factors, alongside many others, has provided a fundamental element that must be considered.

In 2015, photographer Andrew Moore suggested an interest in photographing Buffalo's industrial ruins for a future project. Posting an image of one of the city's grain elevators on his official website (Figure 6), he illustrated the potential of his work in Buffalo to come. While no official statements have been made in the time since this announcement, the prospect of having Moore photograph Buffalo has catalyzed the focus of this epilogue. Should Buffalo welcome this renowned, world-recognized artist, or should the city be concerned about the effects his work may have on its current revitalization efforts? As numerous examples in Detroit have demonstrated, the attention garnered from Moore and other ruin porn photographers has been met with mixed reviews amongst locals. While some income has been generated from tourists flocking to Detroit to see these newly iconic sites, the methods used to guide them through the city have done little to improve the decaying state of the architecture they have traveled to see. Furthermore, the narratives provided on these tours have alienated these spaces from their histories, decontextualizing their relationships to the laborers, residents and even architects and engineers who were once intimately familiar with these buildings in multiple ways.

These impacts would certainly be detrimental to the revitalization efforts currently underway in Buffalo, where factories are being transformed into lofts, silos into art spaces and brownfields into outdoor music venues. With the potential of attracting the same type of visitors that are drawn to Detroit only for its ruins, I am still apprehensive of inviting Moore to photograph our grain elevators and factories. Yet Buffalo is no longer a 'secret,' underappreciated place, as articles from popular publications like *Travel and Leisure* have already encouraged tourists to visit the city's rich collection of historic architecture. Moore's photographs could, of course, encourage viewers to consider a more diverse selection of architecturally significant sites to visit in Buffalo- moving beyond the monuments downtown and into the more wild, overgrown and still somewhat unregulated, abandoned factories in the city's industrial region. Once these architectural tourists arrived, however, how should they be guided through these industrial spaces, and what narratives should be presented?

Ruin porn photography and ruin tourism have made industrial landscapes more visible, but that does not mean that they have made them more legible. The growing interest in industrial sites creates a particularly charged context for architectural historians, who are instrumental in shaping these postindustrial narratives. As a photographer and not a historian, it is perhaps not Moore's responsibility to engage with this kind of sensitivity to historical context and content. Aesthetics, not architectural history, are understandably more of a priority to a photographer like Moore. Yet the impact of these aesthetics are far reaching, with tangible, physical influences on buildings in local communities that extend beyond the confines of an art gallery or book and into the actual spaces depicted in these photographs. In this sense, historians must be incorporated into the tourism industry in some way, along with planners, preservationists and entrepreneurs. Only in working across these disciplines can we encourage a multifaceted approach to understanding architecture- not only historically or spatially, but also sensorily, experientially and even recreationally. In order to capitalize on this opportunity for rejuvenation, it is essential to incorporate a diversity of perspectives, voices and histories that have otherwise been marginalized or absent in the context of ruin porn. These absences are not isolated to the photographic genre, but instead are symptomatic of similar gaps in the historiography of industrial architecture and urban development. By incorporating this diversity of perspectives, there is hope that this rich history of spatial engagement can extend beyond the singular stories of former industrial grandeur or contemporary industrial demise, and move instead towards industrial revitalization in ways we may have not yet even dreamed.

[1] "Buffalo's Renaissance is Attracting Out-of-Town Developers," *The Buffalo News* (Buffalo, NY), September 13, 2016.; Michael Kaminer, "Once-Dicey Buffalo is on the Cusp of Something Big" *New York Daily News* (New York, NY), July 28, 2016.
[2] Some examples of these include: Diane Cardwell, "The Wind and Sun are Bringing the Shine back to Buffalo," *The New York Times* (New York, NY), July 20, 2015. ; Melanie Kaplan, "Buffalo, NY: A New Vitality," *The Washington Post* (Washington, D.C.), July 24, 2014.; Joel Kotkin, "The Rustbelt Roars Back from the Dead," *The Daily Beast* (New York, NY), December 7, 2014.; Jordan Teicher, "Millennials are Moving to Buffalo and Living Like Kings," *The Gothamist* (New York, NY), January 28, 2015.
[3] Jonathan Epstein, "Buffalo Area Housing Market: Record High Sales, Record-Low Inventory," *The Buffalo News* (Buffalo, NY), August 3, 2016.
[4] Katrina Brown Hunt, "America's Favorite Cities," *Travel and Leisure* (New York, NY), January 2017.
[5] "Best Cities to Relocate to in America" *CNBC* (Washington, D.C.), January 13, 2017.
[6] The four structures in Silo City include those historically known as the American/Peavey, the Marine A, the Perot elevator and the Perot malting house. James Stewart and Co. was the primary contractor for each of these structures, including the American/Peavy, where Stewart and Co. pioneered new forms of continuous slip-form concrete construction.
[7] John Urry, *The Tourist Gaze: Leisure and Travel in Contemporary Societies* (London: Sage Publications, 1990), 117.
[8] Thomas Morton, "Something, Something, Something Detroit," *Vice*, August 1 2009, http://www.vice.com/read/something-something-something-detroit-994-v16n8.
[9] John Patrick Leary, "Detroitism," *Guernica,* January 15 2011, http://www.guernicamag.com/features/leary_1_15_11/.
[10] Jefferson Cowie and Joesph Heathcott, *Beyond the Ruins: The Meanings of Deindustrialization (*Ithaca: ILR Press, 2003), 4.
[11] Ibid, 3.
[12] Paul Zucker, *Fascination of Decay: Ruins: Relic, Symbol and Ornament (*Ridgewood, N.J: Gregg Press, 1968), 197.
[13] Camilo Vergara, "Downtown Detroit," *Metropolis* 14 No. 8 (April 1995): 35.
[14] Ibid.
[15] Nick Yablon, *Untimely Ruins: an Archaeology of American Urban Modernity, 1819-1919 (*Chicago: The University of Chicago Press, 2010), 8.
[16] David Nye, *American Technological Sublime* (Cambridge, MA: MIT Press, 1994), 3.
[17] Walter Gropius, "Die Entwicklung Moderner Industriebaukunst," *Jahrbuch des Deutschen Werkbundes*. Munich, Germany: Bruchman, 1913.
[18] Reyner Banham, *A Concrete Atlantis: U.S. Industrial Building and European Modern Architecture, 1900-1925* (Cambridge, MA: M.I.T. Press, 1986), 157.
[19] Emma Ockerman, "Picturesque Blight?" *Detroit Free Press*, last modified January 26, 2014, http://www.freep.com/article/20140126/NEWS01/301260077/urban-ruin-tours-Detroit.
[20] Personal interview with Welter, recorded on September 29, 2014.
[21] Dean MacCannell, *The Tourist: A New Theory of the Leisure Class* (Berkeley, CA: University of California Press, 1999), 109-130.
[22] Personal interview on Welter's tour, conducted and recorded on September 29, 2014.
[23] MacCannell, 40
[24] Tim Edensor, *Industrial Ruins: Spaces, Aesthetics and Materiality* (Oxford: Berg, 2005), 15.
[25] See Lindy Biggs, *The Rational Factory: Architecture, Technology, and Work in America's Age of Mass Production*, Baltimore: Johns Hopkins University Press, 1996.
[26] Edensor, 8.
[27] Jeff Chapman, "Infiltration," *Infiltration*, accessed February 11, 2014, http://www.infiltration.org.
[28] Ibid.
[29] "Detroit Urbex: About," *Detroit Urbex*, accessed March 11, 2014, http://detroiturbex.com/about/index.html.

[30] Catherine Lutz and Jane Collins, *Reading National Photographic (*Chicago: University of Chicago Press, 1993).
[31] Susan Sontag, *On Photography (*New York: Farrar, Straus and Giroux, 1977), 3.
[32] Steven High, *Corporate Wasteland: The Landscape and Memory of Deindustrializaion* (Ithaca, NY: ILR Press, 2007), 55.
[33] Ibid.
[34] Ibid.
[35] "Detroit Urbex: About," *Detroit Urbex*, accessed March 11, 2014, http://detroiturbex.com/about/index.html.
[36] David Kohrman, "Forgotten Detroit," *Forgotten Detroit*, accessed March 8, 2014, http://www.forgottendetroit.com/about.html.
[37] "Detroit Urbex: About," *Detroit Urbex*, accessed March 11, 2014, http://detroiturbex.com/about/index.html.
[38] Lowell Boileau, "Urban Exploration/Ruin Tourism," *DetroitYes!* (discussion forum), March 11, 2014 (9:32 a.m.), http://www.detroityes.com/mb/showthread.php?18051-Urban-exploration-ruin-tourism.
[39] "Blight Tourism: Is Something Wrong with this Picture?" *Hell Yeah Detroit*, last modified January 27, 2014 (7:53 p.m.), http://www.hellyeahdetroit.com/2014/01/26/blight-tourism-is-something-wrong-with-this-picture/
[40] "Urban Exploration/Ruin Tourism," *DetroitYes!* (discussion forum), March 11, 2014 (9:03 p.m.), http://www.detroityes.com/mb/showthread.php?18051-Urban-exploration-ruin-tourism.
[41]Edensor, 5.
[42] Ibid, 95.
[43] Andrew Herscher, *The Unreal Estate Guide to Detroit* (Ann Arbor, MI: University of Michigan Press, 2012), 17.
[44] Ibid, 18.
[45] Ibid, 24.
[46] Ibid, 7.

Figure 1. Art installations, rock climbing and community events at Silo City. Buffalo NY, 2015.

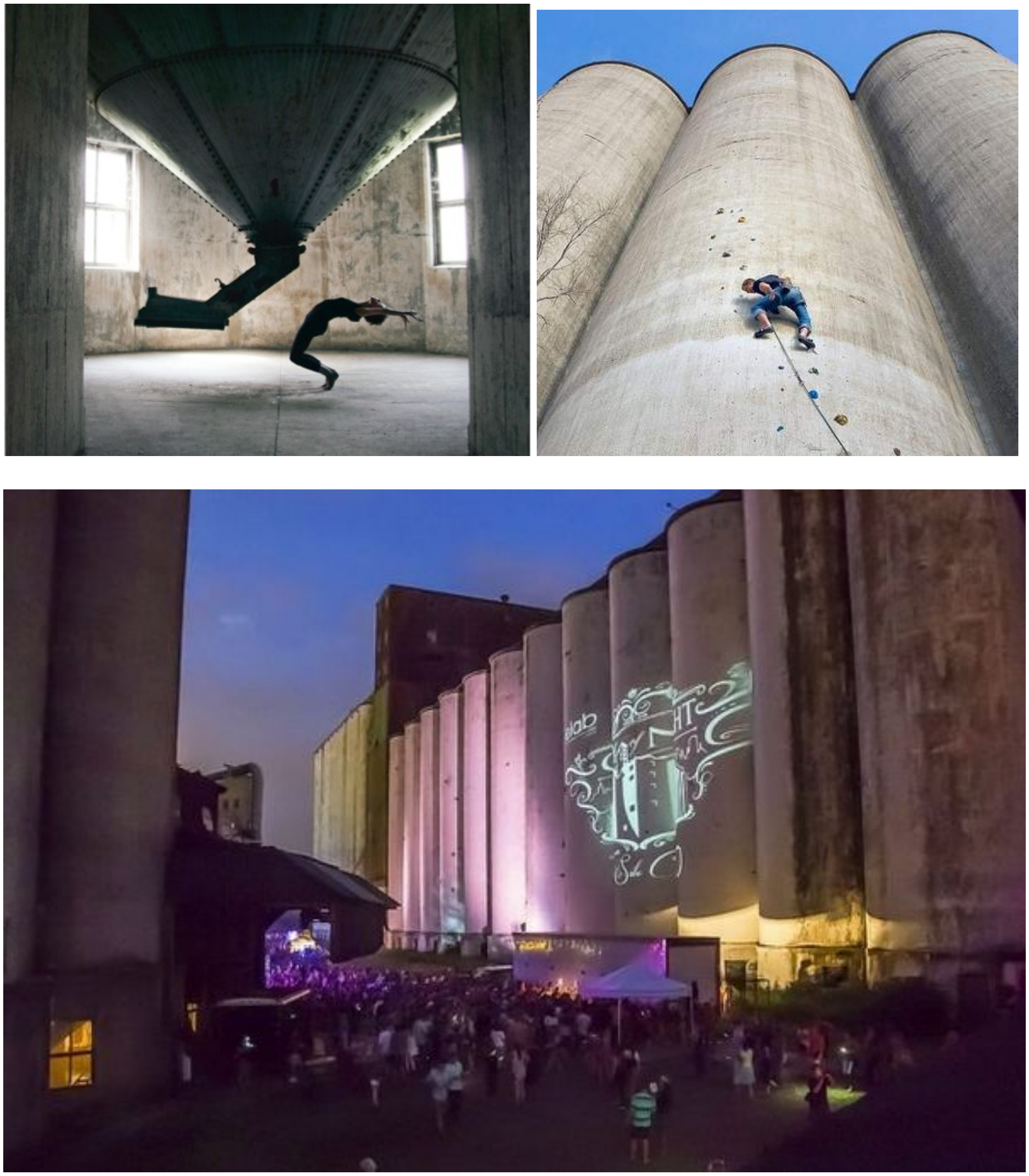


Figure 2. Riverworks entertainment complex. Buffalo, NY. 2016.
The 'Labatt Blue Six-Pack' is painted onto the former Great Lakes Fiber grain elevator, at the base of which is the future site of a brewery and outdoor beer garden, expected summer 2017.

Figure 3. Andrew Moore. "Rolling Hall, Ford Motor Company, River Rogue Complex," *Detroit Disassembled* (Akron, OH: Akron Art Museum, 2010).

Figure 4. John Ames Mitchell. “The Two Monuments in the River.” From *The Last American*, (New York: Frederick A. Stokes, 1889).

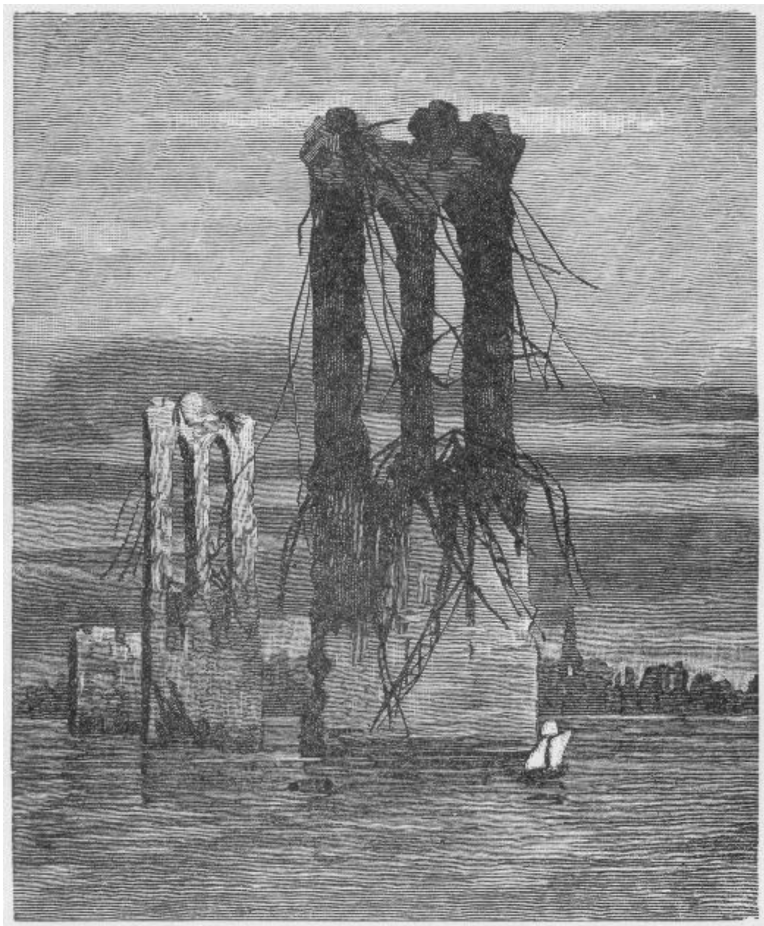


Figure 5. Ruin tourists in Detroit, September 2014. Photographs by author.

Figure 6. Andrew Moore. “Grain Elevator, Buffalo.” 2015.